PhD THESIS DECLARATION

(use a pc to fill it out)

I, the undersigned

FAMILY NAME	ARMENI
NAME	PATRIZIO
Student ID no.	1612530

Thesis title:

Individual and team performance: issues around the role of attributes and relationships among peers

PhD in	BUSINESS ADMINISTRATION AND MANAGEMENT
Cycle	XXVII
Student's Tutor	GIUSEPPE SODA
Year of thesis defence	2017

DECLARE

under my responsibility:

1) that, according to Italian Republic Presidential Decree no. 445, 28th December 2000, mendacious declarations, falsifying records and the use of false records are punishable under the Italian penal code and related special laws. Should any of the above prove true, all benefits included in this declaration and those of the temporary "embargo" are automatically forfeited from the beginning;

2) that the University has the obligation, according to art. 6, par. 11, Ministerial Decree no. 224, 30th April 1999, to keep a copy of the thesis on deposit at the "Bilioteche Nazionali Centrali" (Italian National Libraries) in Rome and Florence, where consultation will be permitted, unless there is a temporary "embargo" protecting the rights of external bodies and the industrial/commercial exploitation of the thesis;

3) that the Bocconi Library will file the thesis in its "Archivio Istituzionale ad Accesso Aperto" (Institutional Registry) which permits online consultation of the complete text (except in cases of temporary "embargo");

4) that, in order to file the thesis at the Bocconi Library, the University requires that the thesis be submitted online by the student in unalterable format to Società NORMADEC (acting on behalf of the University), and that NORMADEC will indicate in each footnote the following information:

- PhD thesis Individual and team performance: issues around the role of attributes and relationships among peers;
- by (S*tudent's family name and name)* ARMENI PATRIZIO ;
- defended at Università Commerciale "Luigi Bocconi" – Milano in the year 2017 ;
- the thesis is protected by the regulations governing copyright (Italian law no. 633, 22nd April 1941 and subsequent modifications). The exception is the right of Università

Commerciale “Luigi Bocconi” to reproduce the same, quoting the source, for research and teaching purposes;

- **only when a separate “Embargo” Request has been undersigned**: the thesis is subject to “embargo” for (indicate duration of the “embargo”) …… months;

5) that the copy of the thesis submitted online to Normadec is identical to the copies handed in/sent to the members of the Thesis Board and to any other paper or digital copy deposited at the University offices, and, as a consequence, the University is absolved from any responsibility regarding errors, inaccuracy or omissions in the contents of the thesis;

6) that the contents and organization of the thesis is an original work carried out by the undersigned and does not in any way compromise the rights of third parties (Italian law, no. 633, 22nd April 1941 and subsequent integrations and modifications), including those regarding security of personal details; therefore the University is in any case absolved from any responsibility whatsoever, civil, administrative or penal, and shall be exempt from any requests or claims from third parties;

7) **choose 7a or 7b**:

X7a) that the thesis is not subject to “embargo”, i.e. that it is not the result of work included in the regulations governing industrial property; it was not written as part of a project financed by public or private bodies with restrictions on the diffusion of the results; is not subject to patent or protection registrations.

Date 27 JANUARY 2017

Abstract

The aim of this thesis is advancing the existing knowledge about the consequences of social relationships among peers in organizations or other professional contexts that require collaboration among individuals. In particular, the empirical part of this thesis addresses i) the consequences of affective ties on behaviors, performance and advantage and ii) the non-linear impact of diversity on performance, mediated by social processes of communication.

Some of these aspects have been investigated in the prior literature from different perspectives, either focusing on individual attributes predicting social interactions, or on pre-existing and evolving social structures as an antecedent of relationships and performance. The main consequences of group social processes and of the emergence of affective ties between individuals have been often read as anticipating behaviors like the willingness of collaborating, organizational citizenship behavior, knowledge sharing, and on performance of individuals and teams.

Building on the results of the previous literature, both my empirical studies propose an integrated perspective encompassing the interplay between aspects that are generally left separated (e.g. diversity, communication and performance, or affective ties, behaviors and advantage).

The first step of my research is a systematic literature review about the theories and perspectives that have been proposed so far about the antecedents, the processes, and the consequences of social interactions among peers. Building on the systematized literature, the second study approaches the theme of diversity and communication in teams, focusing on the interplay between individual attributes aggregated at the team level, communication, and performance. Finally, the third study explores the role of negative affective ties in groups of peers, showing that on the one hand they lower aggregate outcomes but on the other hand, under specific conditions, they are a source of local advantage.

PhD IN BUSINESS ADMINISTRATION AND MANAGEMENT

FINAL DISSERTATION

INDIVIDUAL AND TEAM PERFORMANCE:

ISSUES AROUND THE ROLE OF ATTRIBUTES AND RELATIONSHIPS AMONG PEERS

PhD candidate

Patrizio Armeni

Internal thesis committee

Giuseppe Soda (supervisor), Fabrizio Castellucci, Giovanni Fattore

SUMMARY

General introduction

The aim of this thesis is advancing the existing knowledge about the consequences of social relationships among peers in organizations or other professional contexts that require collaboration among individuals. In particular, the empirical part of this thesis addresses i) the consequences of affective ties on behaviors, performance and advantage and ii) the non-linear impact of diversity on performance, mediated by social processes of communication.

Some of these aspects have been investigated in the prior literature from different perspectives, either focusing on individual attributes predicting social interactions, or on pre-existing and evolving social structures as an antecedent of relationships and performance. The main consequences of group social processes and of the emergence of affective ties between individuals have been often read as anticipating behaviors like the willingness of collaborating, organizational citizenship behavior, knowledge sharing, and on performance of individuals and teams.

Building on the results of the previous literature, both my empirical studies propose an integrated perspective encompassing the interplay between aspects that are generally left separated (e.g. diversity, communication and performance, or affective ties, behaviors and advantage).

The first step of my research is a systematic literature review about the theories and perspectives that have been proposed so far about the antecedents, the processes, and the consequences of social interactions among peers. Building on the systematized literature, the second study approaches the theme of diversity and communication in teams, focusing on the interplay between individual attributes aggregated at the team level, communication, and performance. Finally, the third study explores the role of negative affective ties in groups of peers, showing that on the one hand they lower aggregate outcomes but on the other hand, under specific conditions, they are a source of local advantage.

STUDY I

INDIVIDUAL ATTRIBUTES AND RELATIONSHIPS AMONG PEERS IN THE WORKPLACE: THE CONSEQUENCES ON BEHAVIORS AND PERFORMANCE. A SYSTEMATIC REVIEW.

Patrizio Armeni

Introduction

The group[1] of peers is a fundamental locus of human social structures, since childhood (e.g. Alexander Jr and Campbell 1964, Hansen and Bryant 1980) to professional life in organizations (e.g. Eaton 1951, Warren 1966, Cobb 1980, Bryant 2005) and communities (e.g. Brown 1990, Boyd 1998). In the workplace, employees, workers, professionals and managers are all embedded in social structures which create, among others, a certain degree of interdependence with other individuals and groups that share the same hierarchical level, the same seniority, the same salient attributes or that show some form of structural equivalence (Lorrain and White 1971, Burt 1987). Such interdependence influences group outcomes in terms of emotional states and well-being of individuals, evolution of social capital, and performance. Moreover, working groups are nowadays among the fundamental organizational arrangements for most companies (Lucas 2010). Not surprisingly, then, the importance of peers in organizational and professional settings has been recognized and researched for a long time. However, the composite economic, managerial and social nature of organizations and professional communities offers the opportunity to study the issues around peer colleagues from different perspectives. Therefore, according to the interest of the researcher, the object "group of peers" has been observed from a particular angle and focusing on one specific dimension, e.g. gender balance (Lin 2008), centrality in the network structure (Bowler, Halbesleben et al. 2009), conflict and conflict management (Tekleab, Quigley et al. 2009). As a result, the current picture of issues surrounding working groups of peers is sparse, and the interplay between

[1] In this review, the reference definition of group derived from the literature is "a collection of individuals who are task interdependent, who share one or more goals and the responsibility for their achievement, and who see themselves (and are seen by others) as an intact social entity embedded in a larger organizational setting" (Chan. 1998; Farmer & Roth, 1998).

the different dimensions has been seldom addressed in the literature. The imperfect awareness of such interdependencies is reflected in the lack of consistency in the results and in the managerial implications. For instance, in a meta-analysis on intragroup conflict (de Wit, Greer et al. 2012) the authors reported that, contrary to their expectations, they did not find a strong and negative association between task conflict and group performance. The reason was found in the extreme heterogeneity of study designs, with a huge variety of moderators and other contingent elements, and in the fact that one or more relevant dimensions were generally excluded from the study.

The aim of this review is i) to identify the main streams of literature that have studied working groups of peers, in order to understand the antecedent of behaviors and performance, either at the individual or at the collective level, ii) to provide a possible comprehensive view of the interdependences between the perspectives of analysis, based on the findings of the extant literature. The expected outcome is not suggesting that all the relevant dimensions should be always included in empirical studies, but rather that the apparent inconsistencies in results can be explained in the light of what has been excluded from the analysis so that the transposition from the contingent setting of the study to the managerial practice is more aware of the complementary aspects that should be considered before applying some of the solutions suggested by the literature.

Methodology: the review protocol and the categorization of literature

This study applies the methodology of systematic reviews to perform a wide-range search across different streams of literature. The systematic review has followed a review protocol to identify the studies eligible for full-text analysis.

The review protocol

Search

The search was performed using the following algorithms, applied on the databases Business Source Complete, Web of Knowledge and JSTOR:

#1 TS[2]=((group* OR team*) NEAR/1 (peer* OR colleague*))

AND

#2 TS=((performance*) OR (result*) OR (outcome*) OR (behavior*))

Inclusion criteria:

- Type of publication: academic journal or book
- Language: English
- Time limits: none

Exclusion criteria

- Subjects (EBSCO*host* criteria): online social networks, education, children, confidence intervals.
- Publication: International Journal of Language & Communication Disorders; American Journal of Public Health; Advances in Consumer Research; Economics of Education Review; Review of Economics and Statistics; Applied Economics.
- Industry (NAICS): Educational support services, Vocational Rehabilitation Services, Miscellaneous school (excluding interactions among professionals, Individual services).
- Full-text retrievable: no.

Title and Abstract Screening

The screening of titles and abstracts should be performed by multiple, independent and blinded reviewers (Tranfield, Denyer et al. 2003, Higgins and Green 2008). However, in the case of this review, only one researcher could be involved in the screening phase. To mitigate the consequent bias, three rounds of selections were carried out with an interval of two months between two subsequent screenings. More detail is provided in the limitations section.

[2] Title search.

In the phase of abstract screening, the main exclusion criteria were applied on the dependent variable, the setting different from the organizational or professional one, and the level of analysis. With respect to the outcome variable, behaviors towards colleagues (e.g. organizational citizenship, knowledge sharing), group dynamics (e.g. conflict, communication) and performance were included, while perceptions (e.g. justice, satisfaction) were excluded. The other exclusion criterion regarded the setting, and was applied after the first title screening, because many articles dealt with groups of adolescents (e.g. Alexander Jr and Campbell 1964), or focused mainly on the interactions and trade-offs between work life and family life (e.g. Chiu and Ng 2001).

Full text analysis

The papers selected for full text analysis were reviewed with the aim of i) excluding further contributions not filtered by the exclusion criteria ad ii) identifying relevant categories to allow a meaningful classification of the relevant literature. When a meta-analysis was available, the included papers were replaced by the meta-analysis itself. The process of categorization was conducted following two main driving criteria. First, the articles were grouped according to the dependent variable considered in the study. Second, the articles were classified according to the main antecedent addressed by the researcher (independent variable), that generally identified the theoretical approach, too.

Results

Search results

The articles retrieved after the search on the selected databases were initially pooled, and duplicates were identified and removed. The following figures refer only to unique references. The results of the combined searches is presented below:

- #1 TS=((group OR team) NEAR/1 (peer* OR colleague*)): 19,635 articles
- #2 TS=((performance*) OR (result*) OR (outcome*) OR (behavior*): 1,803,180 articles
- #3 = #1 AND #2: 6,424 articles

The application of progressive filters provided the following results:

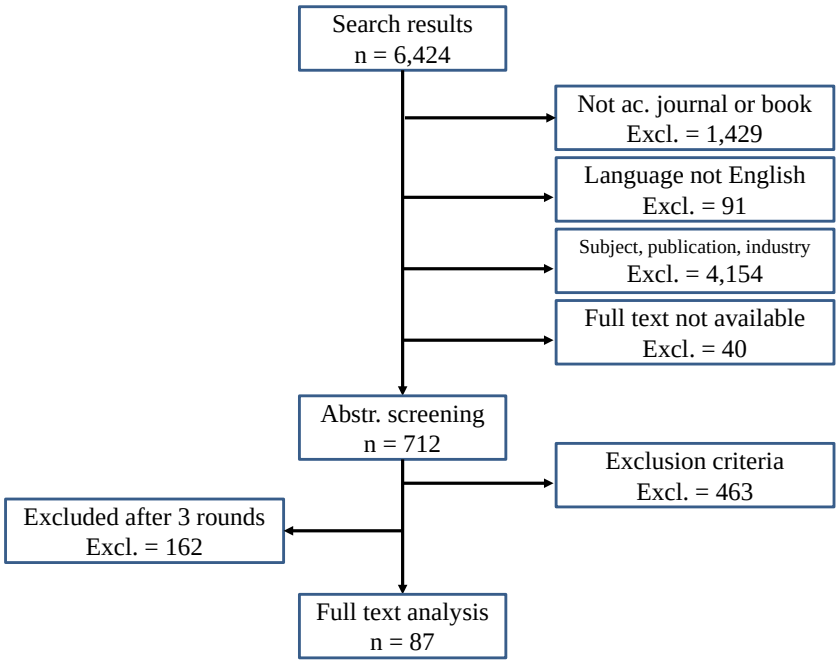
- Search #3 refined with the following progressive filters using EBSCO*host* categories.
  - Academic journal: 4,977
  - Language= English: 4,906
  - Subject: 3,176
  - Publication. 1,363
  - Industry (NAICS): 752
  - Full text available: 712

Abstract screening

463 articles were excluded after abstract screening applying the exclusion criteria. Further 162 articles were excluded after three rounds of selection for reasons other than the exclusion criteria (e.g. historical papers, level of analysis different from than dyads, triads, individuals and teams).

The final sample for full text analysis included 87 papers. The selection process is summarized in Figure 1.

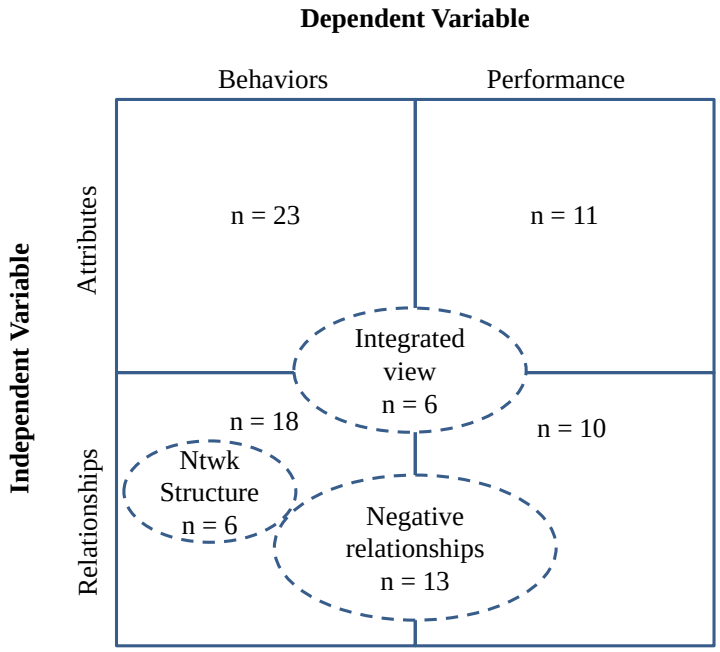
Figure 1: flow chart



Categories

The full text analysis had the objective of categorizing the retrieved contributions in order to map the relationships studied in the literature around working groups of peers. According to the outcome variable, two broad categories emerged: studies about performance and studies about organizational behaviors. With respect to the main independent variable, instead, the articles could be grouped into studies mainly focusing on the attributes of group members (e.g. gender, age, professional background, etc.), either measured at the individual level or aggregated at the collective (group) one, and studies mainly focusing on relationships among group members. A relevant sub-set of the latter category included studies focusing on intra-group relationships, with a focus on the negative content of the affective or instrumental tie. The last category regarded literature contributions providing an attempt to the integration between attributes and relationships. This category included articles whose research question was, in principle, consistent with one or more of the other four categories, but the simultaneous presence of attributes and relationships that *interact* in the same framework, justified the creation of such ad-hoc class. The categorization process is summarized in Figure 2.

Figure 2: categorization of the reviewed contributions and number of retrieved articles



Direct impact of individual attributes on performance

The first category of studies included contributions, mainly developed within the organizational behavior literature, where the main focus was on the direct impact of individual attributes on performance. Individual attributes were often reported as aggregated team-level measures, consistent with the whole literature about diversity (see Harrison and Klein 2007 for a comprehensive treatment of the main constructs and measures of diversity). Individual characteristics included demographic attributes, professional background, personality traits, and values.

Campion and colleagues have explored the impact of demographic characteristics and attitudes on performance in two studies, one involving employees and the other focused on professionals (Campion, Medsker et al. 1993, Campion, Papper et al. 1996). In both studies, team composition showed some significant impact on performance, but the effects varied greatly according to the measure of composition (e.g. heterogeneity of individual

demographic characteristics, number of members or individual attitudes towards flexibility). Moreover, the effects of the different dimensions of composition were not consistent across different perspectives of performance (performance perceived by employees or rated by supervisors and managers). In 2001, a meta-analysis provided a first summary of the evidence on diversity and performance (Webber and Donahue 2001), concluding that neither job-related or non-job-related diversity had an impact on performance. Bolin et al. (1996) measured the impact of the big 5 personality traits on the creative outcome of brainstorming group (quality and quantity of ideas) and on group processes (communication, effort, etc.), using aggregate group-level means as independent variables. Interestingly, some traits predicted outcomes but not group processes (openness, emotional stability) and vice-versa (extraversion) (Bolin and Neuman 2006). In this case, however, the authors did not consider the dispersion of attributes, but rather focused on group-level means. Moreover, group processes and group outcomes were considered independently and a potential causal chain was not hypothesized. Also in this case, results seemed inconclusive and rather opening question than providing solutions for practitioners. A study published in 2009 and based on undergraduate and MBA students teams (Glew 2009) assessed the effects of personal values related to team work on the performance of individual team members and on the performance of the team as a whole. The results showed how prior performance, more than values, was a strong predictor of in-team peer-reviewed performance of members, while values were positively associated with performance only when they were shared at the collective level and not varying too much among individual members. A notable conclusion is that diversity of values is potentially detrimental for performance. An opposite conclusion was reached by Roberge and van Dick (2010), who proposed a theoretical framework based on social psychology, where diversity had several positive effects on performance if social psychological mechanisms, e.g. mutual learning, are activated (Roberge and van Dick 2010). Unfortunately, they did not provide the solution for activating those mechanisms, nor explained to what extent they directly depended on the degree of diversity. Looking at the impact of professional tenure diversity on individual creativity, Gilson et al. (2013) found that diversity influenced creativity through the acquisition of explicit knowledge (Gilson, Lim et al. 2013). The latter was

also influenced by tenure diversity, with the moderation of knowledge sharing. That paper was one of the first examples of integration between characteristics of individuals and social dynamics, but the two were seen as independent factors that, together, influence performance.

A first paper aiming to an explanation of the mixed results obtained in the previous literature appeared in 2010 (Haas 2010), and concluded that the main reason of inconsistency was the lack of contextualization of the studies, with poor treatment of generalizability issues. Surprisingly, however, Haas limited his review only to works that did not explicitly considered group processes. The following year, a meta-analysis (Bell, Villado et al. 2011) dedicated to the impact of diversity on performance revealed that the effects varied greatly according to the mission of the team (e.g. product development, creative teams, etc.). In general, demographic characteristics like age, gender and race showed small direct effects on performance, while professional and educational background showed mixed effects on final team outcomes, confirming that conclusive evidence was yet to be provided.

The studies falling in this first category show that individual characteristics, possibly aggregated at the team level, may impact performance directly. However, this relationship was i) highly contextual, given the huge variety of settings and of potential moderators, ii) not consistent across similar studies and iii) it appeared to be simplistic in its managerial implications. Indeed, if individual characteristics were direct predictors of performance – not only for individuals but also for groups of peers– managers could design the “perfect team” just finding the appropriate mix of diversity. Behaviors and group processes are either considered independent contextual factors (control variable or, in the best case, moderators) or simply ignored (given for granted or completely determined). However, behaviors and group processes are related to individual attributes, as reviewed in the second sub-sample of studies.

Impact of individual attributes on organizational behaviors

The second category included studies where individual characteristics were considered as an antecedent of behaviors. The research question about the relationship between attributes and behaviors was also explored in the psychological literature, but following our inclusion and exclusion criteria, this review has limited the analysis to contributions from the managerial literature, and the psychology literature was only included when the impact on managerial practice was explicitly mentioned. The behaviors considered in the literature were mainly related to organizational and interpersonal citizenship, including knowledge-sharing and conflict management. The main explanatory variables were, instead, demographic characteristics, values and a substantial importance is often given to extra-group managerial actions directed to correct potentially adverse group-processes. Only one paper presented an integrated approach to knowledge sharing, including both personality traits, demographic diversity and managerial actions (Cabrera, Collins et al. 2006).

A relevant part of the analyzed papers explored the antecedents of citizenship behaviors, and the most frequent ones were diversity and dissimilarity of individual attributes. Demographic characteristics, personality traits and personal values were strong predictors of organizational commitment and related behaviors, namely organizational and interpersonal citizenship (Gray 1989, Tsui and Gutek 1999, Jones and Schaubroeck 2004, Leonard, Sara et al. 2010). With respect to the impact of demographic characteristics, dissimilarity and diversity based on physical attributes were recognized both as positive and negative antecedent of organizational citizenship behavior (Chattopadhyay 1999, Hobman, Bordia et al. 2004, Jones and Schaubroeck 2004), according to the categorization processes elicited by the type of diversity (Mamman, Kamoche et al. 2012). Generally, race and gender dissimilarity elicited lower levels of interpersonal and organizational citizenship, but the direction of this effect is strongly dependent on group-level values (Triana and García 2009, Triana, Kim et al. 2011) and of managerial actions directed to mitigate negative reactions to diversity (Jie, D'Netto et al. 2010, Moshabaki, Madani et al. 2013). Moreover, the relationship between visible demographic characteristics and intra-group behaviors was mediated by organization-based self-esteem

and affective reactions, making the practical implications more intriguing. Indeed, organizations should not only consider that diversity and dissimilarity influence behaviors but also that if the organization is not able to i) generate and maintain diversity-related values and ii) make the mediation mechanism translate or mitigate the effects, the predicted impacts can vanish or even invert their direction. When referring to the distribution of information, however, diversity and dissimilarity seemed more a risk factor for group effectiveness than an element that should be managed through values or transmission mechanisms, and its impact is contextual to the type of task. This was the conclusion reached by Van der Vegt and Van de Vliert (2003 and 2005), whose studies on senior management students assigned of a group-work and organizational project teams revealed that, under conditions of low task interdependence, helping behavior is reduced by high perceived skill dissimilarity (Van Der Vegt, Van De Vliert et al. 2003, Van der Vegt and Van De Vliert 2005). When task interdependence is high, however, the effect is reversed. The implication was that diversity (and dissimilarity, its perceived counterpart) referred to acquired knowledge and skills followed a different mechanism of transmission on behaviors, with higher likelihood of selfish choices, compared with diversity on demographic attributes. Indeed, in both the moderated relationships highlighted by Van der Vegt and Van de Vliert (2005), individuals with higher skills tended to protect their knowledge unless task interdependence was so high that, without activating helping behaviors, the performance of the more skilled person herself would have been reduced. Choi (2009) presented consistent results in terms of the uncertain effect of information diversity on helping behaviors, but included trust and perceived benevolence/integrity as moderators, lowering the direct dependence of results on task characteristics (Choi 2009).

The relationship between personality traits and behaviors showed a lower degree of complexity. However, with respect to conflict management styles (Antonioni 1998, Bolin and Neuman 2006, Roberge, Xu et al. 2012), some interesting trade-offs emerged. For instance, in Antonioni (1998) agreeableness and extraversion were both positively correlated with integrating style, but agreeableness increased avoiding while extraversion showed an opposite effect. This result indicated that the relationship between personality and behavior in the workplace was a composite product of different traits. It was unclear,

however, to what extent could the group environment elicit single traits instead of a mix of them, stimulating a conflict-management style more that another. A recent meta-analysis (Daejeong, Colbert et al. 2015) contextualized the impact of personality traits on behaviors towards organizations according to the type of culture (individualistic vs collectivistic), showing that normative and affective commitment to the organization were more impacted by personality traits in collectivistic cultures than in individualistic ones. However, some effects did not change across cultures, namely the negative correlation of emotional stability, openness to experience and extraversion with continuance commitment.

Cabrera et al. (2006) provided a more integrated perspective on the determinants of knowledge sharing, including personality traits, perceptions, contextual organizational elements and task characteristics. They showed that all the considered variables could impact the willingness of individuals to share knowledge with their peers, widely confirming the results of the previous literature. Still, they did not propose an advanced comprehension of the interplay between the different variables included in their analysis, that were treated as independent (Cabrera, Collins et al. 2006).

The contributions aiming at enlightening the link between attributes and behaviors showed a higher consensus on the directions of the effects, compared to the studies included in the first category. They generally agree on the conclusion that such effects were not deterministic. Indeed, moderators and mediators were often relative to managerial actions. A consequence of this conclusion is that there must be processes, between attributes and behaviors, that can be addressed by managerial actions. Such processes were explored in the literature that opened the black-box of relationships among peers.

Direct impact of relationships on performance

The literature focusing on interpersonal relationships fell mainly in the domains of organizational behavior and social network theory. The greatest part of the studies reviewed here explored and tested the association between interpersonal relationships and behaviors (next category), then deriving implications for performance. A small number of

contributions, however, hypothesized a direct link between relationships and performance. In these cases, performance was generally the outcome of a creative process. Burt (2004) used data on managers from a different departments on one large corporation to show that individuals spanning structural holes in a network were more likely to have good ideas and better rewards. The key element explaining superior performance was the access to various sources of knowledge and information that could be integrated to produce novel and valuable ideas (Burt 2004). This mechanism, however, was not tested but simply hypothesized. Similar to Burt's was also the conclusion reached by Nerkar and Paruchuri (2005), whose study showed how an inventor's position in the network predicted the likelihood with which the knowledge created by an inventor was used in the firm's research and development (Nerkar and Paruchuri 2005). McFadyen and Cannella Jr (2004) explored the relationship between social capital and knowledge creation at the individual level, showing that both the number and the strength of interpersonal relationships increased the creative outcome, even though tie strength mattered more than the number of relationships (McFadyen and Cannella Jr 2004). The importance of the number, captured by a centrality measure, was found, instead, being a relevant factor for the increase in patent quality in the case of teams and collaborations among inventors (Beaudry and Schiffauerova 2011). The same study also showed that repeated collaboration had a negative impact on the creative performance. The two results, taken together, were consistent with Burt (2004), confirming that creativity was a function of the access to multiple sources of non-redundant information. Soda and Bizzi (2012) challenged such simple relationship, arguing that ties hold by individuals did not all carry the same effect and that multiple sources of information are not enough to secure a positive performance. Following an innovative conceptualization of creativity, defined as the deviation from the past and from partners, the authors tested a set of hypotheses concerning the trade-offs between the effects of intra-team and extra-team relationships as well as the competing effects of partners' heterogeneity (Soda and Bizzi 2012). Shifting the analysis to the organizational level, social networks represent the informal social structure. Only recently, scholars have studied the interplay between social networks and the formal elements of social structures within organizations (McEvily, Soda et al. 2014). In particular, Soda and Zaheer (2012) theorized and empirically tested the consequences

of consistency between formal and informal networks of information and advice. They showed that while consistency had a positive effect on individual performance, the direction of the impact of inconsistency depends on the type of workflow interdependency. According to their results, network inconsistency when the workflow was characterized by reciprocal interdependence had an inverted u-shaped relationship with performance, so that there was an intermediate optimum level of inconsistency, but inconsistency was always detrimental in the case of sequential interdependence.

All these studies had to provide an interpretation of the mechanisms that translated relationships (and their structure) to performance. Seldom, these mechanisms were formally included in the analysis: the meaningful conceptualizations and description of phenomena lacked, then, of the direct practical implications for implementing organizational actions. A larger number of studies provides a closer look to the consequences of relationships by focusing on behavioral consequences.

Impact of relationships on organizational behaviors

One of the first studies explicitly addressing the behavioral consequences of relationships in groups of peers was published in 1966 (Warren 1966). In this study, that used school staff (teachers) as empirical setting, the author identified two types of relationships, job-related and social relationships. The former were more likely to generate compliance (behavioral conformity) and the latter were more associated with commitment (attitudinal conformity). The contribution of Warren was to provide a crucial distinction in the content of the relationship. Moreover, he showed that the type of task moderated the effects of relationships on behaviors and attitudes.

Most papers, however, instead of studying convergence, focused on interpersonal and organizational citizenship behaviors, knowledge-sharing and work engagement. Social network theory is the most prevalent theoretical and methodological approach.

With respect to organizational citizenship behaviors, Bowler and Brass (2006, 2009) used social exchange theory to study the impact of different types of ties and social embeddedness on performance and receipt of interpersonal citizenship (Bowler and Brass

2006, Bowler, Halbesleben et al. 2009). Friendship, especially when perceived as a strong tie, was a positive predictor of both receipt and performance of interpersonal citizenship. Relational influence increased receipt but decreased performance of interpersonal citizenship, while social dependence showed an interesting negative effect on both. The last result indicates that peers are more likely to engage in interpersonal citizenship behaviors than individuals occupying different positions in the hierarchy. Notably, these effect were obtained after controlling for demographic and job dissimilarity, even if no interaction or consequent logical association was tested. Lam et al. (2011) showed that the expected dissimilarity in performance prevented individuals from displaying helping behaviors (Lam, Van der Vegt et al. 2011). This conclusion was consistent with a sort of jealousy effect. A different perspective on organizational citizenship behavior was provided by social learning theory and social information processing theory. In fact, using these two theoretical lenses, organizational citizenship was predicted by strong advice ties rather than friendship ties and weak ones (Zagenczyk, Gibney et al. 2008).

With respect to knowledge-sharing, in the context of a grounded theoretical framework for exchange decisions among scientists, Bouty (2000) argued that sharing precious knowledge, with peers working for other organizations requires relationships based on high levels acquaintance and mutual trust (Bouty 2000). A strong relationship was, here, a necessary condition for knowledge-sharing, even though this result was evidently context-embedded. This type of knowledge-sharing, however, led outside the boundaries of organizational citizenship and helping behaviors, because it dealt with knowledge exchanged across, rather than within, organizations and most likely going against organizational expectations (indeed, such exchange could be interpreted as a social capital leak). When knowledge-sharing was, instead, instrumental for collaborating organizations, and thus encouraged, Lawson et al. (2009) showed that it was facilitated more by informal social relationships than by formal arrangements, e.g. cross-functional teams (Lawson, Petersen et al. 2009). The pathways of knowledge diffusion within organizations has been often studied as a consequence of tie strength. Granovetter (1973) argued that weak ties play an important role in distributing information beyond the limited network of strong ties and are, therefore, an important means of diffusion (Granovetter 1973). Jack

(2005) extended Granovetter's work, reinforcing the role of strong ties. At the end of her ethnographic study, she concluded that strong ties were more instrumental for business activity than weak ties, and that strong ties included the mechanisms to invoke weak ones and were more likely to be reactivated after they became dormant (Jack 2005). Dormant ties were, indeed, an underexploited source of fresh knowledge, once reactivated (Levin, Walter et al. 2011). Hansen (1999) tested empirically the different roles of strong and weak ties for knowledge diffusion, in a study conducted on product-development teams. The main conclusion was that strong ties were more valuable for transferring complex knowledge while weak ties allowed the team to reach more varied knowledge (Hansen 1999). However, when the transferred knowledge was codified, strong ties could harm the effectiveness of knowledge-sharing (Hansen 2002). The latter result is partly contradicted by Byosiere et al. (2010), who argued that sharing tacit knowledge is facilitated by strong ties, while weak ties are more valuable when sharing explicit knowledge (Byosiere, Luethge et al. 2010). Another relational factor influencing knowledge-sharing was the degree of competition in the team (Hongwei, Baruch et al. 2014). Hongwei and colleagues showed that a balanced level of competition, influenced by team collectivism, favor knowledge-sharing, compared to hyper-competition.

With respect to work engagement, Freeney and Fellenz (2013) showed that the greatest proportion of the variance was explained by the characteristics of the social environment, and especially by strong social support from peers (Freeney and Fellenz 2013).

A distinctive characteristic of social network literature is the inherent multilevel nature of most contributions deriving from its relational foundations (Ibarra, Kilduff et al. 2005). Beyond interpersonal relationships, then, network-level characteristics, emerging from the comprehensive view of the whole set of existing relationships, could be also important in influencing individual behaviors, group-level processes, and performance.

Network structure

Burt (1987) showed that structural equivalence influenced the diffusion of a new drug more than cohesion (Burt 1987). While cohesion was conceptualized as the direct interaction with a colleague, structural equivalence referred to the action that should be

expected by an individual occupying the same position in the social structure. The importance of structural equivalence supported the argument that expectations and behavioral pressures exist in the social structure beyond the level of individual-to-individual relationships. Reagans and McEvily (2003) proposed, instead, a balanced perspective of group-level cohesion around a relationship and network structure (range) as factors easing knowledge-sharing (Reagans and McEvily 2003). In this case, however, social cohesion followed a different conceptualization compared to Burt (1987), that encompassed the neighborhoods of a relationship instead of the relationship itself. Tortoriello et al. (2012) expanded the research stream on boundary spanners as facilitators of the knowledge flow, focusing on the influence of the broader network where boundary spanning occurs (Tortoriello, Reagans et al. 2012). They found that tie strength, cohesion and range where all three contextual factors with a positive influence on the relationship between boundary spanning and knowledge transfer. Soda et al. (2004) investigated the impact of time and network structures on performance showing that closure and structural holes have unlike effects at different points in time. Namely, current structural holes and past closure are both factors enhancing current performance (Soda, Usai et al. 2004). Chung et al (2011) focused, instead, their research on the structural antecedents of interpersonal citizenship behavior, showing that a dense network facilitated interpersonal citizenship, with particular concentration on central individuals, while decentralized groups made citizenship in local triads more difficult (Chung, Park et al. 2011). The value of this paper was mostly associated with the discussion of the trade-off between structural positions in global and local networks.

While the literature focusing on single relationships had straightforward practical implications for individuals and provided valuable insights for managers, the contributions focusing on the impact of network structure (or position of individuals in the structure) are less directly linked to concrete actions of individuals and managers, stressing the consequences of network embeddedness more than the effects of managerial and organizational actions. However, these studies are vital in limiting the generalizability of the former literature, with the additional merit of clarifying that the effect of a single tie on the behaviors of node-individuals is not independent from the other ties existing in the

surroundings (embeddedness), stressing the typical endogeneity[3] of social network studies.

Articles focusing on negative relationships

A promising and intriguing literature has blossomed around the issue of negative relationships in the workplace. A negative relationship can be either affective (e.g. negative friendship) or instrumental (e.g. harming). The literature has initially showed the detrimental effects of negative relationships but, later, has started unveiling more shadowed aspects of their sources and consequences. These consequences could also be expanded if people are supposed to strategically manage their relationships in the workplace (Gersick, Dutton et al. 2000).

Negative personal relationships among members of the same team could be detrimental for performance (Duffy, Lee et al. 2012). Sparrowe et al. (2001) showed that centrality in advice and hindrance networks was related to both individual and team-level performance but with opposite effects –positive for advice networks and negative for hindrance ones- (Sparrowe, Liden et al. 2001). Venkataramani and Dalal (2007) showed that centrality in desirable and undesirable networks was also related to interpersonal citizenship: centrality in desirable networks, indeed, was found to be positively associated with interpersonal citizenship (helping) and negatively associated with harming. The opposite was true for centrality in non-desirable networks (Venkataramani and Dalal 2007), and the effect went beyond the interpersonal citizenship, because centrality in positive and negative affective networks also impacted organizational attachment (Venkataramani, Labianca et al. 2013). Affective ties, combined with personality traits, predicted team-level interpersonal citizenship in knowledge-sharing (Bi-Fen, Wei-Li et al. 2011). Lyons and Scott (2012) proved that the receipt of interpersonal citizenship was an important predictor of the performance of the same behavior and a similar effect applied for affective relationships which, in turn, also elicited positive or negative helping behaviors (Lyons and Scott 2012). The mechanisms through which negative ties influence behaviors and performance were deepened by Labianca and Brass (2006). According to the authors, negative ties

[3] Under this perspective, endogeneity is a richness and not a flaw of social network theory.

within groups of peers elicited negative judgments, attitudes, and behavioral intentions (Labianca and Brass 2006). Moreover, negative relationships amplified the perception of inter-group conflicts within the same organization (Labianca, Brass et al. 1998), even though conflict per-se did not impair performance, according to the results of a meta-analysis (de Wit, Greer et al. 2012). Over time, a negative relationship could also bias peer evaluations and generate a vicious loop between affect and performance (Taggar and Brown 2006). Moreover, when a negative tie emerges from a past friendship, the detrimental effects are even increased (Rockett and Valenti 2013). De Jong et al. (2014) investigated the mechanisms that allow organizations to attenuate the detrimental effects of negative ties. Building on social interdependence theory, they showed that high task interdependence and high levels of team-member exchange attenuate the extent to which teams and organizations suffer from negative relationships (de Jong, Curşeu et al. 2014). However, except for team-member exchange, more than providing insights for managers, de Jong and colleagues seemed more concerned to identify contextual conditions in which the effects of negative ties were higher or lower.

Overall, the literature on negative affective relationships has an impressive potential, because it explores the dark side of organizations and human interactions. Moreover, the research questions around negative relationships have been much less explored in the past, so that there is substantial space for research. However, it carries several difficulties, too. For example, surveying employees and managers about their negative relationships is a very delicate task. Top managers do not easily agree on distributing surveys that include the evaluation of negative ties. This is why most scholars have tested the hypothesized effects on students, leaving substantial uncertainty on the extent to which the results obtained in such surrogate setting are also valuable in real-world organizations.

Articles attempting an integration between attributes and relationships

This final set of papers included the studies that, even if showing consistency with the characteristics of some of the previous categories, shared the attempt at providing a framework in which both attributes and relationships were included (and not as mere control variables for one another).

Reagans et al. (2004) have shown how the simultaneous use of demographic and network variables reveals a stronger effect of the latter (Reagans, Zuckerman et al. 2004). Tagliaventi and Mattarelli (2006) reported that knowledge-sharing between professional groups was positively impacted by common values (attributes) and repeated interactions (relationships) favored by proximity (Tagliaventi and Mattarelli 2006). According to Chattopadhyay (1999), trust was as mediator between demographic dissimilarity and organizational citizenship behavior (Chattopadhyay 1999). Similarly, Hopkins and Hopkins (2002), theorized the consequences of cultural recomposition in working groups, suggesting that after rebalancing the attributes of team members, group processes are influenced and also, indirectly, performance (Hopkins and Hopkins 2002). Smith et al. (2005) showed that the innovative performance of managers employed by technology firms was a function of both individual knowledge (individual attribute) and the information acquired through social relationships (Smith, Collins et al. 2005).

With the exception of Reagans et al. (2004), the contributions included in this category proposed a framework where attributes anticipate social relationships which, in turn, influence behaviors. Proposing such a logical chain raises the problem on what is the real organizational lever that should be used to drive the social structure of organizations towards desirable group processes and outcomes. Should organization work of team design, based on individual attributes? Should they intervene later to correct the effects of diversity? In the discussion section, the questions emerging from the reviewed literature will be addressed.

Discussion

This review has highlighted that most issues around working groups of peers have been explored by the literature. However, most studies tended to remain localized in one region of the broad picture of relationships (Figure 3). On the one hand, this result is a natural consequence of the multidimensional nature of organizations and professional environments. On the other hand, however, a sparse knowledge is not fully efficient in explaining the interplay between the different issues, with a potential loss of interpretational power. After having reviewed contributions from different streams of

literature, that only shared the interest in the managerial consequences, this study proposes three main discussion points.

1) Endogenous relationships and loops

Attributes, personal ties, behaviors and performance are all embedded in a highly endogenous set of causal relationships. Attributes are often seen as an antecedent in the broad picture, but the literature showed that many attributes can be influenced over time by relationships, behaviors and performance. The same applies for the other elements of the picture. Then, the straightforward causal chain (attributes → relationships → behaviors → performance) is not working in a single direction. Indeed, many of the possible direct and inverted causal relationships have been studies and supported. A notable consequence is that every study that chooses to focus on a single direction and on a partial set of these elements, will suffer from theoretical endogeneity. With respect to the implications for practice, such endogeneity exposes organizations and managers to over-simplified solutions, that ignore the bidirectional causality of their interventions. For example, suppose one organization is trying to increment the level of creativity. Based on the literature, managers hire people with high levels of openness to experience. On the one hand, their inclusion facilitates the circulation of knowledge and is likely to produce better creative results in the short term. On the other hand, people high in openness then to be less loyal and quit the organization more easily. This could increase the level of uncertainty in the environment, reducing the cohesion among employees, which will reduce interpersonal citizenship and, therefore, will also reduce the returns of knowledge-sharing. This is just an example of the interplay between attributes, relationships, behaviors and performance whose mutual interdependent effects are studied by parts, in isolation and typically from different perspectives.

2) Being aware of the missing part of the picture

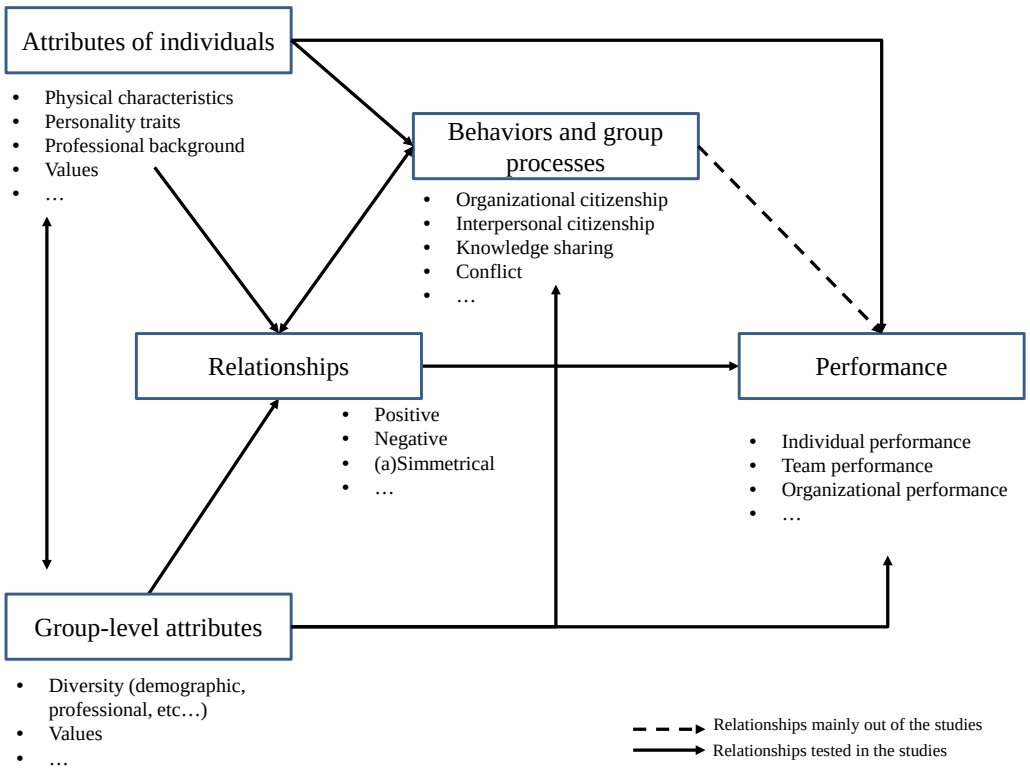
A consequence of the first point is that organizations should be more aware of the interplay between the elements included in Figure 3, and avoid the quest for unidirectional recipes. The analysis of the literature showed that actions taken to improve desirable social processes and outcomes do not have local effects only but tend to rebound and

extend their impact beyond organizational expectations. Being aware of the complexity of consequences of organizational decisions will help managers to anticipate rebound effects, lowering the negative impact of unexpected effects.

3) Areas of further development

Among the issues covered by prior literature, the area of negative relationships seemed still requiring more in-depth analyses. Negative relationships are less studied but their effect can be larger and faster than the one of positive relationships (concept of negative bias). Moreover, so far, the literature has stressed heavily on the negative consequences of these relationships. Indeed, the fact that negative ties exist and survive conceals the possibility that negative ties carry potential local advantages. Overcoming the resistance to study a negative phenomenon in a positive perspective, we could increase our knowledge about if and why negative ties represent a local source of advantage that contrast their negative collective outcome.

Figure 3: Map of the explored relationships



Limitations

This review has some important limitations. First, the systematic approach requires more than one researcher for conducting the selection phase (Tranfield, Denyer et al. 2003). This procedure aims at reducing possible biases in the exclusion or inclusion of studies. The protocol-driven selection is not considered safe enough to avoid such biases, so more reviewers (generally two or three) are asked to independently perform the selection process. After the first round of selection, the level of consensus is measured and discordant choices are discussed until a final decision is made (Higgins and Green 2008). All that was not possible in this case, and the reviewer is only one researcher. However, to mitigate the bias, the selection phase has been repeated three times with a distance of about two months between two subsequent selections. The consensus was not 100% and increased in the last round (due to learning) but this gave the opportunity of better evaluating doubtful cases. Second, given the broad objective of this study, a meta-analysis has not been included. Even though meta-analyses provide synthetic evidence of the effects, the result of this review is to be read more at the levels of theory and of empirical design more than looking at the actual quantitative results. Finally, the boundaries of the review (i.e. the inclusion and exclusion criteria) are inherently blurred due to the high number of studies, the variety of disciplines involved and the diversity of the research questions. The choice made for this study is, therefore, potentially questionable. However, the review has been designed to contribute the managerial literature on group performance, and the inclusion and exclusion criteria were decided accordingly, therefore excluding all the relevant contributions that did not have a direct evaluation of group outcomes measured as performance.

References

Alexander Jr, C. N. And E. Q. Campbell (1964). "Peer Influences On Adolescent Educational Aspirations And Attainments." American Sociological Review **29**(4): 568-575.

Antonioni, D. (1998). "Relationship Between The Big Five Personality Factors And Conflict Management Styles." International Journal Of Conflict Management **9**(4): 336-355.

Beaudry, C. And A. Schiffauerova (2011). "Impacts Of Collaboration And Network Indicators On Patent Quality: The Case Of Canadian Nanotechnology Innovation." European Management Journal **29**(5): 362-376.

Bell, S. T., A. J. Villado, M. A. Lukasik, L. Belau And A. L. Briggs (2011). "Getting Specific About Demographic Diversity Variable And Team Performance Relationships: A Meta-Analysis." Journal Of Management **37**(3): 709-743.

Bi-Fen, H., W. Wei-Li And Y. Ryh-Song (2011). "Team Personality Composition, Affective Ties And Knowledge Sharing: A Team-Level Analysis." International Journal Of Technology Management **53**(2-4): 331-351.

Bolin, A. U. And G. A. Neuman (2006). "Personality, Process, And Performance In Interactwe Brainstorming Groups." Journal Of Business & Psychology **20**(4): 565-585.

Bouty, I. (2000). "Interpersonal And Interaction Influences On Informal Resource Exchanges Between R&D Researchers Across Organizational Boundaries." Academy Of Management Journal **43**(1): 50-65.

Bowler, W. M. And D. J. Brass (2006). "Relational Correlates Of Interpersonal Citizenship Behavior: A Social Network Perspective." Journal Of Applied Psychology **91**(1): 70-82.

Bowler, W. M., J. R. B. Halbesleben, M. Stodnick, M. T. Seevers And L. M. Little (2009). "The Moderating Effect Of Communication Network Centrality On Motive To Perform Interpersonal Citizenship." Journal Of Managerial Issues **21**(1): 80-96.

Boyd, E. A. (1998). "Bureaucratic Authority In The "Company Of Equals": The Interactional Management Of Medical Peer Review." American Sociological Review **63**(2): 200-224.

Brown, B. B. (1990). "Peer Groups And Peer Cultures."

Bryant, S. E. (2005). "The Impact Of Peer Mentoring On Organizational Knowledge Creation And Sharing: An Empirical Study In A Software Firm." Group & Organization Management **30**(3): 319-338.

Burt, R. S. (1987). "Social Contagion And Innovation: Cohesion Versus Structural Equivalence." American Journal Of Sociology: 1287-1335.

Burt, R. S. (2004). "Structural Holes And Good Ideas." American Journal Of Sociology **110**(2): 349-399.

Byosiere, P., D. J. Luethge, A. Vas And M. P. Salmador (2010). "Diffusion Of Organisational Innovation: Knowledge Transfer Through Social Networks." International Journal Of Technology Management **49**(4): 401-420.

Cabrera, A., W. C. Collins And J. F. Salgado (2006). "Determinants Of Individual Engagement In Knowledge Sharing." The International Journal Of Human Resource Management **17**(2): 245-264.

Campion, M. A., G. J. Medsker And A. C. Higgs (1993). "Relations Between Work Group Characteristics And Effectiveness: Implications For Designing Effective Work Groups." Personnel Psychology **46**(4): 823-847.

Campion, M. A., E. M. Papper And G. J. Medsker (1996). "Relations Between Work Team Characteristics And Effectiveness: A Replication And Extension." Personnel Psychology **49**(2): 429-452.

Chattopadhyay, P. (1999). "Beyond Direct And Symmetrical Effects: The Influence Of Demographic Dissimilarity On Organizational Citizenship Behavior." Academy Of Management Journal **42**(3): 273-287.

Chiu, W. C. K. And C. W. Ng (2001). "The Differential Effects Of Work- And Family-Oriented Women-Friendly Hrm On Oc And Ocb: The Case For Single Female Employees In Hong Kong." International Journal Of Human Resource Management **12**(8): 1347-1364.

Choi, J. N. (2009). "Collective Dynamics Of Citizenship Behaviour: What Group Characteristics Promote Group-Level Helping?" Journal Of Management Studies **46**(8): 1396-1420.

Chung, M.-H., J. Park, H. K. Moon And H. Oh (2011). "The Multilevel Effects Of Network Embeddedness On Interpersonal Citizenship Behavior." Small Group Research **42**(6): 730-760.

Cobb, A. T. (1980). "Informal Influence In The Formal Organization: Perceived Sources Or Power Among Work Unit Peers." Academy Of Management Journal **23**(1): 155-161.

Daejeong, C., A. E. Colbert And O. In-Sue (2015). "Understanding Organizational Commitment: A Meta-Analytic Examination Of The Roles Of The Five-Factor Model Of Personality And Culture." Journal Of Applied Psychology **100**(5): 1542-1567.

De Jong, J. P., P. L. Curşeu And R. T. A. J. Leenders (2014). "When Do Bad Apples Not Spoil The Barrel? Negative Relationships In Teams, Team Performance, And Buffering Mechanisms." Journal Of Applied Psychology **99**(3): 514-522.

De Wit, F. R. C., L. L. Greer And K. A. Jehn (2012). "The Paradox Of Intragroup Conflict: A Meta-Analysis." Journal Of Applied Psychology **97**(2): 360-390.

Duffy, M. K., K. Lee, Eby, T. And Allen (2012). "Negative Interpersonal Exchanges In Teams." Siop Organizational Frontiers Series. Personal Relationships: The Effect On Employee Attitudes, Behavior, And Well-Being: 195-219.

Eaton, J. W. (1951). "Social Processes Of Professional Teamwork." American Sociological Review **16**(5): 707-713.

Freeney, Y. And M. R. Fellenz (2013). "Work Engagement, Job Design And The Role Of The Social Context At Work: Exploring Antecedents From A Relational Perspective." Human Relations **66**(11): 1427-1445.

Gersick, C. J. G., J. E. Dutton And J. M. Bartunek (2000). "Learning From Academia: The Importance Of Relationships In Professional Life." Academy Of Management Journal **43**(6): 1026-1044.

Gilson, L. L., H. S. Lim, M. M. Luciano And J. N. Choi (2013). "Unpacking The Cross-Level Effects Of Tenure Diversity, Explicit Knowledge, And Knowledge Sharing On Individual Creativity." Journal Of Occupational & Organizational Psychology **86**(2): 203-222.

Glew, D. J. (2009). "Personal Values And Performance In Teams: An Individual And Team-Level Analysis." Small Group Research **40**(6): 670-693.

Granovetter, M. S. (1973). "The Strength Of Weak Ties." American Journal Of Sociology: 1360-1380.

Gray, D. E. (1989). "Gender And Organizational Commitment Among Hospital Nurses." Human Relations **42**(9): 801.

Haas, H. (2010). "How Can We Explain Mixed Effects Of Diversity On Team Performance? A Review With Emphasis On Context." Equality, Diversity & Inclusion **29**(5): 458-490.

Hansen, B. K. And B. K. Bryant (1980). "Peer Influence On Sharing Behavior Of Mexican-American And Anglo-American Boys." Journal Of Social Psychology **110**(1): 135.

Hansen, M. T. (1999). "The Search-Transfer Problem: The Role Of Weak Ties In Sharing Knowledge Across Organization Subunits." Administrative Science Quarterly **44**(1): 82-111.

Hansen, M. T. (2002). "Knowledge Networks: Explaining Effective Knowledge Sharing In Multiunit Companies." Organization Science **13**(3): 232-248.

Harrison, D. A. And K. J. Klein (2007). "What's The Difference? Diversity Constructs As Separation, Variety, Or Disparity In Organizations." Academy Of Management Review **32**(4): 1199-1228.

Higgins, J. P. And S. Green (2008). Cochrane Handbook For Systematic Reviews Of Interventions, Wiley Online Library.

Hobman, E. V., P. Bordia And C. Gallois (2004). "Perceived Dissimilarity And Work Group Involvement The Moderating Effects Of Group Openness To Diversity." Group & Organization Management **29**(5): 560-587.

Hongwei, H., Y. Baruch And L. Chieh-Peng (2014). "Modeling Team Knowledge Sharing And Team Flexibility: The Role Of Within-Team Competition." Human Relations **67**(8): 947-978.

Hopkins, W. E. And S. A. Hopkins (2002). "Effects Of Cultural Recomposition On Group Interaction Processes." Academy Of Management Review **27**(4): 541-553.

Ibarra, H., M. Kilduff And T. Wenpin (2005). "Zooming In And Out: Connecting Individuals And Collectivities At The Frontiers Of Organizational Network Research." Organization Science **16**(4): 359-371.

Jack, S. L. (2005). "The Role, Use And Activation Of Strong And Weak Network Ties: A Qualitative Analysis." Journal Of Management Studies **42**(6): 1233-1259.

Jie, S., B. D'netto And T. Jiong (2010). "Effects Of Human Resource Diversity Management On Organizational Citizen Behaviour In The Chinese Context." International Journal Of Human Resource Management **21**(12): 2156-2172.

Jones, J. R. And J. Schaubroeck (2004). "Mediators Of The Relationship Between Race And Organizational Citizenship Behavior." Journal Of Managerial Issues **16**(4): 505-527.

Labianca, G. And D. J. Brass (2006). "Exploring The Social Ledger: Negative Relationships And Negative Asymmetry In Social Networks In Organizations." Academy Of Management Review **31**(3): 596-614.

Labianca, G., D. J. Brass And B. Gray (1998). "Social Networks And Perceptions Of Intergroup Conflict: The Role Of Negative Relationships And Third Parties." Academy Of Management Journal **41**(1): 55-67.

Lam, C. K., G. S. Van Der Vegt, F. Walter And X. Huang (2011). "Harming High Performers: A Social Comparison Perspective On Interpersonal Harming In Work Teams." Journal Of Applied Psychology **96**(3): 588.

Lawson, B., K. J. Petersen, P. D. Cousins And R. B. Handfield (2009). "Knowledge Sharing In Interorganizational Product Development Teams: The Effect Of Formal And Informal Socialization Mechanisms." Journal Of Product Innovation Management **26**(2): 156-172.

Leonard, K., M. Sara And M. Ken (2010). "Feeling (And Acting) Like A Fish Out Of Water: Numerical Minority Status, Gendered Work And Citizenship Behavior In Mixed Gender Work Teams." Team Performance Management **16**(7/8): 413-433.

Levin, D. Z., J. Walter And J. K. Murnighan (2011). "Dormant Ties: The Value Of Reconnecting." Organization Science **22**(4): 923-939.

Lin, C.-P. (2008). "Examination Of Gender Differences In Modeling Ocbs And Their Antecedents In Business Organizations In Taiwan." Journal Of Business & Psychology **22**(3): 261-273.

Lorrain, F. And H. C. White (1971). "Structural Equivalence Of Individuals In Social Networks." The Journal Of Mathematical Sociology **1**(1): 49-80.

Lucas, L. M. (2010). "The Role Of Teams, Culture, And Capacity In The Transfer Of Organizational Practices." Learning Organization **17**(5): 419-436.

Lyons, B. J. And B. A. Scott (2012). "Integrating Social Exchange And Affective Explanations For The Receipt Of Help And Harm: A Social Network Approach." Organizational Behavior & Human Decision Processes **117**(1): 66-79.

Mamman, A., K. Kamoche And R. Bakuwa (2012). "Diversity, Organizational Commitment And Organizational Citizenship Behavior: An Organizing Framework." Human Resource Management Review **22**(4): 285-302.

Mcevily, B., G. Soda And M. Tortoriello (2014). "More Formally: Rediscovering The Missing Link Between Formal Organization And Informal Social Structure." The Academy Of Management Annals **8**(1): 299-345.

Mcfadyen, M. A. And A. A. Cannella Jr (2004). "Social Capital And Knowledge Creation: Diminishing Returns Of The Number And Strength Of Exchange Relationships." Academy Of Management Journal **47**(5): 735-746.

Moshabaki, A., F. Madani And H. Ghorbani (2013). "An Investigation Of The Role Of Human Resource Diversity Management On Organisational Citizenship Behaviour From Organisational Justice And Commitment Point Of View In Automotive Industry In Iran." International Journal Of Management & Enterprise Development **12**(4): 331-348.

Nerkar, A. And S. Paruchuri (2005). "Evolution Of R&D Capabilities: The Role Of Knowledge Networks Within A Firm." Management Science **51**(5): 771-785.

Reagans, R. And B. Mcevily (2003). "Network Structure And Knowledge Transfer: The Effects Of Cohesion And Range." Administrative Science Quarterly **48**(2): 240-267.

Reagans, R., E. Zuckerman And B. Mcevily (2004). "How To Make The Team: Social Networks Vs. Demography As Criteria For Designing Effective Teams." Administrative Science Quarterly **49**(1): 101-133.

Roberge, M.-É. And R. Van Dick (2010). "Recognizing The Benefits Of Diversity: When And How Does Diversity Increase Group Performance?" Human Resource Management Review **20**(4): 295-308.

Roberge, M.-É., Q. J. Xu And D. M. Rousseau (2012). "Collective Personality Effects On Group Citizenship Behavior: Do Diverse Groups Benefit More?" Small Group Research **43**(4): 410-442.

Rockett, T. And M. A. Valenti (2013). "When A Friend Becomes A Foe: The Effects Of Relational Rifts On Individuals And Groups." Journal Of Management Policy & Practice **14**(5): 57-69.

Smith, K. G., C. J. Collins And K. D. Clark (2005). "Existing Knowledge, Knowledge Creation Capability, And The Rate Of New Product Introduction In High-Technology Firms." Academy Of Management Journal **48**(2): 346-357.

Soda, G. And L. Bizzi (2012). "Think Different? An Investigation Of Network Antecedents And Performance Consequences Of Creativity As Deviation." Strategic Organization **10**(2): 99-127.

Soda, G., A. Usai And A. Zaheer (2004). "Network Memory: The Influence Of Past And Current Networks On Performance." Academy Of Management Journal **47**(6): 893-906.

Taggar, S. And T. C. Brown (2006). "Interpersonal Affect And Peer Rating Bias In Teams." Small Group Research **37**(1): 86-111.

Tagliaventi, M. R. And E. Mattarelli (2006). "The Role Of Networks Of Practice, Value Sharing, And Operational Proximity In Knowledge Flows Between Professional Groups." Human Relations **59**(3): 291-319.

Tekleab, A. G., N. R. Quigley And P. E. Tesluk (2009). "A Longitudinal Study Of Team Conflict, Conflict Management, Cohesion, And Team Effectiveness." Group & Organization Management **34**(2): 170-205.

Tortoriello, M., R. Reagans And B. Mcevily (2012). "Bridging The Knowledge Gap: The Influence Of Strong Ties, Network Cohesion, And Network Range On The Transfer Of Knowledge Between Organizational Units." Organization Science **23**(4): 1024-1039.

Tranfield, D., D. Denyer And P. Smart (2003). "Towards A Methodology For Developing Evidence Informed Management Knowledge By Mean
Journal Of Management **14**(3): 207-222.

Triana, M. D. C. And M. F. García (2009). "Valuing Diversity: A Group-Value Approach To Understanding The Importance Of Organizational Efforts To Support Diversity." Journal Of Organizational Behavior **30**(7): 941-962.

Triana, M. D. C., K. Kim And M. García (2011). "To Help Or Not To Help? Personal Value For Diversity Moderates The Relationship Between Discrimination Against Minorities And Citizenship Behavior Toward Minorities." Journal Of Business Ethics **102**(2): 333-342.

Tsui, A. S. And B. A. Gutek (1999). Demographic Differences In Organizations: Current Research And Future Directions, Lexington Books.

Van Der Vegt, G. S. And E. Van De Vliert (2005). "Effects Of Perceived Skill Dissimilarity And Task Interdependence On Helping In Work Teams." Journal Of Management **31**(1): 73-89.

Van Der Vegt, G. S., E. Van De Vliert And A. A. D. Oosterhof (2003). "Informational Dissimilarity And Organizational Citizenship Behavior: The Role Of Intrateam Interdependence And Team Identification." Academy Of Management Journal **46**(6): 715-727.

Venkataramani, V. And R. S. Dalal (2007). "Who Helps And Harms Whom? Relational Antecedents Of Interpersonal Helping And Harming In Organizations." Journal Of Applied Psychology **92**(4): 952-966.

Venkataramani, V., G. Labianca And T. Grosser (2013). "Positive And Negative Workplace Relationships, Social Satisfaction, And Organizational Attachment." Journal Of Applied Psychology **98**(6): 1028-1039.

Warren, D. I. (1966). "Social Relations Of Peers In A Formal Organization Setting." Administrative Science Quarterly **11**(3): 440-478.

Webber, S. S. And L. M. Donahue (2001). "Impact Of Highly And Less Job-Related Diversity On Work Group Cohesion And Performance: A Meta-Analysis." Journal Of Management **27**(2): 141-162.

Zagenczyk, T. J., R. Gibney, A. J. Murrell And S. R. Boss (2008). "Friends Don't Make Friends Good Citizens, But Advisors Do." Group & Organization Management **33**(6): 760-780.

STUDY II

WHEN PEERS COUNT: THE MEDIATING ROLE OF COMMUNICATION WITHIN PROFESSIONAL SUBGROUPS ON TEAM PERFORMANCE IN FUNCTIONALLY DIVERSE TEAMS

Patrizio Armeni, Amelia Compagni and Stefano Tasselli

Introduction

Organizations are changing in ways that demand enhanced collaboration among people with different expertise and knowledge (Grant and Parker, 2009). Functionally diverse teams, that is teams combining individuals with different skills and professional backgrounds (Jackson, 1995), have become a common way of organizing work in modern organizations (Grant and Parker, 2009). Such teams integrate diverse viewpoints and competences, promise higher quality problem-solving and, in general, generate potentially more creativity and innovativeness in performing interdependently even complex tasks (e.g., Jackson et al., 2003; Lant et al., 2003).

Understanding the relationship between diversity and performance is an important issue for managers, because the activity of designing teams holds latent promises of benefit. Many aspects of this relationship are, however, still to be understood. In particular, we address the micro-processes happening below the team level but above the individual one, advancing the existing literature that has been mostly focused on the macro-level, on the individual one or on only structural aspects the intermediate level.

The amount of research on diversity and performance is considerable (see the meta-analyses by Bower et al., 2000; Horwitz and Horwitz, 2007; Jackson et al., 2003; Webber and Donahue, 2000) but it has proven to lack the theoretical foundations to explain the heterogeneity of results. In fact, the diversity literature has not been able to asses whether functional diversity within teams is related to an improved team performance or not. For example, some studies have shown that teams with a high degree of functional diversity tend to perform better than teams with a low degree of diversity (e.g. Bantel, 1993; Lant et al., 1992). On the contrary, other studies indicate that individuals from different

professions working in the same team tend to approach tasks with diverse perspectives, knowledge and sets of beliefs (Jehn et al., 1997; Mitchell et al., 2011). Diversity can often result in cognitive misalignments and difficulties in communicating and integrating disparate sets of knowledge (Cronin and Weingart, 2005; Majchrzak et al., 2012). As a consequence, it might impair final team performance (van Knippenberg and Schippers, 2007). Overall, therefore, the mechanisms that explain whether team functional diversity has a positive or negative impact on performance are poorly understood within the diversity literature (van Knippenberg et al., 2004; van Knippenberg and Schippers, 2007). This represented an important unanswered issue for organisational research and called for further investigation i) of the social structure below the whole team and ii) of the micro-processes within teams that account for the relationship between team functional diversity and outcomes (Bunderson and Sutcliffe, 2002; Lawrence, 1997).

An important advancement has been proposed by the subgroup literature (e.g., Carton and Cummings, 2012), a stream of studies positing that in work teams, hypothetical dividing lines based on multiple attributes (faultlines) split the whole team into relatively homogeneous subgroups (Thatcher and Patel, 2011).. This theoretical framework stems from both diversity and social categorization. In particular, the social categorization literature has convincingly and repeatedly shown how the diversity of professional backgrounds within teams can easily trigger so-called social categorization processes (Turner et al., 1987; Tajfel and Turner, 1986). Through these processes, individuals classify themselves into distinct categories based on their professional backgrounds, and tend to sort themselves into one or more homogenous subgroups (Lau and Murnighan, 1998, 2005), splitting the team along one or more faultlines (Thatcher and Patel 2012).

The positive contribution of subgroups is that they allow researchers to address an intermediate level between the whole team and the individual, where most of the processes leading to the inconclusive results of the previous literature are likely to take place. The first studies – with the notable exceptions of Bezrukova et al. (2009) and Gibson and Vermeulen (2003) – generally considered subgroups as necessarily disruptive or problematic for final team performance (e.g. Jehn et al., 1999; Pelled et al., 1999). Curton and Cummings (2013) proposed a structural analysis of the impact of subgroups'

configurations on team performance. The main explanatory variables were the type of subgroup (identity-based or knowledge-based), the number of subgroups, their size and their balance. They found that some configurations (e.g. a large number of balanced knowledge-based subgroups) are more beneficial than others for team performance. However, since they do not address the social processes within subgroups, the mechanism between subgroup formation and performance is still to be explained. The exploration of social processes within subgroups has received attention only recently, but the investigation has been limited to processes happening in subgroups already in place, not observing the mechanisms since the formation of subgroups. For instance, one recent study showed that the inclusion of the team leader in a subgroup leads to different dynamics within subgroups and explicitly included the subgroup level in its multilevel analysis (Meyer, Shemla, Li, and Wegge, 2015). Another recent study showed that different subgroups can show different within-subgroup levels of social loafing (Meyer, Schermuly, and Kauffeld, 2015).

In this paper, we further develop the we develop a set of hypotheses and a mediation model positing that a specific social process unfolding within subgroups, in particular the frequency of communication among subgroup members, can work to translate functional diversity into better team performance. We label this construct “within-subgroup communication” to indicate that it occurs within a professionally-homogeneous subgroup within the team.

Our contribution is threefold. First, we add to the subgroup literature by introducing subgroup-level processes (within-subgroup communication) as a mechanism that links subgroup formation to performance. Consistently with the subgroup literature, our findings indicate that coping with diversity is not only an individual cognitive and affective process (Garcia-Prieto et al., 2003; Milliken et al., 2003), nor exclusively a team-level effort (e.g. Brown and Hewstone, 2005; Lovelace et al., 2001; Pettigrew and Tropp, 2013; Schippers et al., 2003), but elaborating on diversity can also take place at an intermediate level of social aggregation, the subgroup. However, differently from the existing literature, we concentrate on the internal dynamics of subgroups since their formation. Second, by focusing on the concrete communicative behaviour of individuals

forming the subgroup we depart from the work of other scholars (Bezrukova et al., 2009; Gibson and Vermeulen, 2004; Molleman, 2005) who have focused on subgroup members' attributes (i.e. types of attributes and level of overlap among attributes) or on subgroups' configuration (Carton and Cummings, 2013) to explain the influence of subgroups on team outcomes. Our study suggests that, besides who forms the subgroup and how subgroups are structured within the team, it is what the individuals *do* in the subgroup, more specifically how much they meet and communicate, that helps explain variance in team performance. Finally, the present study shows that within-subgroup communication, beyond a certain level, can work against team performance (Thatcher and Patel, 2012). As such, we contribute to set the conditions that determine whether within-subgroup communication occurs and to what extent it might make an important difference for the team's final outcomes.

Our empirical case study is set in healthcare where, at international level, the issue of inter-professional teamwork has become very prominent (Currie and White, 2012; Mitchell et al., 2010), in particular with reference to the care of chronic diseases in community settings. The process of care of chronically-ill patients requires indeed continuous collaboration among distinct categories of professionals with different backgrounds and competences (Mitchell et al., 2010). Structurally, the configuration of our teams reflects one of the most critical cases identified by Carton and Cummings (2013), i.e. the team with one knowledge-based subgroup with few sparse individuals outside the subgroup.

In the following section, we review the theoretical tenets of our study with a specific focus on social categorization theory and propose the set of hypotheses and the mediation model that we empirically test. Next, we describe our research setting and explain how the case of functionally diverse teams in primary care is suited to address our research question. We then summarize our main findings and, finally, we discuss the implications of our results for theories of organizational diversity and for management practice.

Theory and hypothesis development

Team functional diversity, subgroup formation and within-subgroup communication

A key argument of theory and research on social categorization is that, when working in teams, individuals tend to categorize team members as "us" and "others" based on the similarity of one or more features (Tajfel, 1982; Tajfel and Turner, 1986). These features include surface-level demographic attributes, such as gender, age, and ethnicity (Williams and O'Reilly, 1998), and deep-level attributes, such as norms, knowledge and professional or educational background (Turner et al., 1987).

Individuals with different professional backgrounds are trained to identify and solve problems using distinctive and often incommensurable methods (Pelled, 1996). They are also known for developing different knowledge bases and competences through education and work practices (Currie and White, 2012; Friedson, 1986; Majchrzak et al., 2012). To the extent that knowledge, cognitive frameworks and skill sets depend on the professional background of individuals (Friedson, 1986; Jackson, 1995), functional diversity can be conceived as a salient attribute to trigger self-categorization processes (Jehn et al., 1997; Mitchell et al., 2011; Turner et al., 1987). Through these processes, individuals in the team classify themselves into distinct categories (Tajfel and Turner, 1986), for example on the basis of their professional background (Lau and Murnighan, 1998, 2005; Thatcher and Patel, 2012). As a result, hypothetical division lines (or faultlines) are created within the team and tend to partition the team itself into one or more homogeneous subgroups (Bezrukova, et al, 2009; Gibson and Vermeulen, 2003; Lau and Murnighan, 1998, 2005; Carton and Cummings, 2012). Through interaction and communication among subgroup members, self-categorization stops from being an individual attitude and becomes a social process: team members who classify themselves into the same category tend to attract one another by homophily (Byrne, 1971; McPherson et al., 2001), form a group of people who have similar views on things (Gibson and Vermuelen, 2003), and identify with the subgroup (Brewer, 1979). Carton and Cummings, 2012, provide a typology of subgroups that differ along the nature of social processes that generate within the subgroups. In particular, they distinguish identity-based, resource-based and knowledge-based

subgroups. We focus on the latter type, whose characteristics are more evident for a manager aiming to design a team. Interestingly, in knowledge-based subgroups, inter-subgroup processes are characterized by information processing (Carton and Cummings, 2012) that we observe through within-subgroup communication.

Professions are often associated with power and status differentials (Currie et al., 2012; Friedson, 1986; Saguy et al., 2008) that might further enhance subgroup formation (Dovidio, et al., 2009). When professionals, in team with different others, feel that their professional identity, expertise and even their occupational boundaries are threatened they tend to react by reinforcing the sense of solidarity with the members of their subgroup (Hornsey and Hogg, 2000; Mitchell et al, 2011). For example, Skevington (1980) found that when high-status nurses (status based on training) were supposed to work together with low-status nurses, they emphasised their distinctiveness and superiority over the low-status group. In other words, in the presence of professional status and power differentials, the high-status group will try to reinforce these differentials (Currie et al., 2012; Saguy et al., 2008) by explicitly showing to prefer to be, work and talk with subgroup members (Bunderson and Reagans, 2011).

The literature predicts that, when experiencing diversity in a functionally diverse team, those who are of the same profession will tend to interact more frequently to reinforce their self-identity (Kossinets and Watts, 2009; Molleman, 2005), they will communicate more with one another to share opinions and information (Bezrukova et al., 2009), and they will engage more frequently in debates within the subgroup (Gibson and Vermeulen, 2003). We hypothesise that the frequency of communication among subgroup members (hereafter, within-subgroup communication) will increase with the increase of the functional diversity of the team[1]. In other words, when in the team either the number of professions or the number of individuals belonging to the other professions increase, we predict that individuals will further intensify the frequency of within-subgroup communication, in the attempt to reinforce their internal solidarity, and maximise similarities within the “in-group” (Hornsey and Hogg, 2000). Our first hypothesis, therefore, reads:

Hypothesis 1: **Team functional diversity leading to subgroup formation will be positively associated with the frequency of communication among members of professionally-homogenous subgroups, i.e. within-subgroup communication.**

Within-subgroup communication and team performance

The social categorization literature has, for the most, depicted subgroup formation as a process detrimental for team performance (Thatcher and Patel, 2012). Relationships between subgroup members (the in-group) and the rest of the team (the out-group) have been shown to be often associated with negative stereotypes (Abrams et al., 1990), and subgroup members have been found to consider similar others more professionally able and trustworthy than the rest of the team (Brewer, 1979; Cramton and Hinds, 2005). In-group favouritism can lead to conflicts (Jehn, 1995, 1997; Pelled et al., 1999; van Kippenberg et al., 2004) and these, in turn, are thought to impair team functioning (Jehn et al. 1999; van Knippenberg and Schippers, 2007).

Building on the line of reasoning proposed by Bezrukova, et al. (2009), Gibson and Vermuelen (2003) and Carton and Cummings (2013), here we suggest that the potential virtuous processes at play within subgroups should not be neglected and that, indeed, "subgroups may enable a team to reap the benefits of diversity" (Gibson and Vermuelen, 2003; p. 203). First, individuals of the same profession share language and mental models (Currie and White, 2012; Friedson, 1986; Mitchell et al., 2011), that, through socialization and interaction, allow them to rapidly build trust in each other (Powell, 1990), and to create a climate of high psychological safety among themselves (Edmonson, 1999). This means that individual subgroup members might feel particularly at ease and confident with voicing and discussing their own ideas and perspectives with rest of the team (Gibson and Vermeulen, 2003), sure as well of a strong backing from the other subgroup members (Strasser et al., 1989). According to Gibson and Vermeulen (2003), such openness to the sharing of ideas can, in turn, have positive spill-overs for the overall team and be conducive to better team learning.

Second, social interaction and communication among members of the subgroup can work as an occasion to reflect upon and make sense of problematic changes to work tasks and roles occurring in the team (Reay et al., 2013; Chreim et al., 2007), and to stimulate processes of discursive persuasion that justify new work practices as appropriate (and advantageous), leading to their being reframed in a more positive light (Reay et al., 2013). Subgroup members might, in this way, build support for a given interpretation of the team situation, and reach an agreement about actions to be taken in the team (Donnellon et al., 1986), for instance by elaborating on a common goal that the overall team should work on and try to achieve (Allport, 1954; Pettigrew, 1998).

When in-group/out-group dynamics are at play and conflicts arise, discussions among those who are alike might allow for an even better definition of differences between the subgroup and the rest of the team (Hewstone and Brown, 1986), for an establishment of clearer boundaries with respect to professional identities and roles (Cramton and Hinds, 2003; Reay and Hinings, 2009), and for the development of a more collaborative attitude towards the other team members (Bezrukova et al., 2009). As Brewer observed "outgroups can be viewed with indifference, sympathy, even admiration, as long as intergroup distinctiveness is maintained" (1999, p. 434). Communication within the subgroup can lead, in other words, to what scholars have defined as "mutual positive distinctiveness" (Cramton and Hinds, 2003; Hewstone and Brown, 1986), to indicate that it is associated with a positive attitude towards working together with other team members, and with seeing the differences as a potential source of advantage for the group as a whole (Cramton and Hinds, 2003).

Nevertheless, the boundary between being open to listening to and collaborating what the rest of the team, and being self-referential and divisive is rather feeble (Bowers et al., 2000). The literature shows that, through repeated interactions, homogenous group members tend to become myopic to the ideas and to the information coming from other team members, and to accept, instead, without questioning those of their similar counterparts (Abrams et al., 2010). Homogenization of point of views and behaviours within subgroups is further enhanced by the good degree of lateral control that normally develops among peers (Barker, 1993; Lazega, 2000). Within the subgroup, members work

as watchdogs for inappropriate behaviours and exert social influence to conform to a common practice and perspective (Lazega, 2000). Overall, we suggest that high levels of within-subgroup communication lead to the inhibition of interaction and information flow among team members (Gibson and Vermuelen, 2003), to a further polarization of the subgroup with respect to the rest of the team (Lau and Murnighan, 2005) and, in the end, to lower team performance.

Therefore, here we hypothesise a curvilinear effect of within-subgroup communication on team performance, such that an increase in within-subgroup communication will be associated with better team performance, but up to a point beyond which team performance will be impaired:

Hypothesis 2. **Within-subgroup communication will be associated with team performance in a curvilinear fashion (inverted U-shaped).**

In the previous sections we have developed two hypotheses that link team functional diversity to within-subgroup communication, and within-subgroup communication to team performance, respectively. We now propose an overarching mediation model that posits within-subgroup communication as a relevant mechanism translating functional diversity into team performance. In keeping with social categorization theory, we have argued that individuals of the same profession encountering dissimilar others within a functionally diverse team will tend to react by forming a professionally-homogenous subgroup, and by increasing the frequency of the communication among themselves (Kossinets and Watts, 2009; Molleman, 2005). Within-subgroup communication, in turn, will allow them to develop a positive attitude towards working together and achieving a common goal with the rest of the team (Bezrukova et al., 2009; Gibson and Vermeulen, 2003). We argue, therefore, that the performance by the team's different professions of collaborative work processes characterized by a high degree of interdependence (Allport, 1954), will benefit the most from the positive effects of within-subgroup communication. When within-subgroup communication reaches high levels, though, this mechanism can become mainly a way for the subgroup to reinforce itself in contrast to the rest of team

(Lau and Murnighan, 2005), hindering the good performance of collaborative and interdependent team work processes. In summary, we, therefore, hypothesize:

Hypothesis 3: **Within-subgroup communication will mediate the relationship between team functional diversity and performance, but in a curvilinear fashion (inverted U-shaped), so that for high levels of within-subgroup communication team performance will eventually decrease.**

Research setting: the case of primary care teams

We tested the hypotheses and the mediation model described above on a sample of 213 functionally diverse teams, called Primary Care Units (PCUs), that have been created in an Italian region (over 4 million inhabitants). PCUs are functionally diverse since they are formed by individuals of different professional backgrounds (Jackson, 1995): general practitioners (GPs), nurses and specialist doctors. PCUs are work teams as their members share common goals and undertake interdependent tasks towards the achievement of collective team outcomes (Kozlowski and Bell, 2003). In particular, PCUs have been created with the aim of improving the management of chronic diseases (Armeni et al., 2014). The management of chronic diseases requires care processes based on the "collaborative interdependence" (Allport, 1954; Cramton and Hinds, 2005) of GPs, nurses and specialists, all contributing to a final common goal (i.e. the "good management" of chronic diseases) through their respective tasks. Chronically-ill patients have long-term health problems that need constant monitoring to keep stable and avoid inappropriate access to the hospital (Mitchell et al., 2010). In primary care, it is the joint work of GPs, nurses and specialists that is thought to provide continuity and appropriateness of care, and, ultimately, better health to chronic patients (Mitchell et al., 2010).

In a number of settings functionally diverse teams have only recently become the new way of organising work processes in primary care (e.g. Armeni et al., 2014; Bojadzievski and Gabbay, 2011; Reay et al., 2013; Somech, 2006). Several scholars contend that the effects of diversity are moderated by temporal factors (Jackson et al, 2003; Harrison,

Price, Gavin, and Florey 2002; Pelled et al, 1999) but most studies either concentrate on consolidated teams or do not specify at which point in time teams are observed (Jackson et al, 2003). The case of multi-professional teams in primary care has, therefore, the potential to provide precious insights in the early phases of the evolution of functionally diverse teams.

In the Italian setting, the PCUs represented an important novelty especially for GPs, who had been used to working either alone or in spontaneous small group practices of only 3-4 GPs (Armeni et al., 2014; Fantini et al., 2012). Given that the present work is part of a long-term research project studying the early evolution of these teams, we had the opportunity to talk informally to a number of GPs and to conduct some preparatory interviews specifically in two PCUs. Similarly to what observed in other contexts (e.g. Chreim et al., 2007; Reay et al., 2013; Somech, 2006), the main changes in work activities, introduced by the creation of the PCU, have affected GPs, while other professions have roughly kept their roles (Chreim et al., 2007). Especially for the management of chronic diseases, for the first time, groups of GPs had to structure their work taking into consideration the contribution of other professions, in particular nurses and specialist doctors, who would co-locate with them in the ambulatory facility for that purpose. The idea that the good management of chronic diseases was a common goal was further reinforced by a system of accountability, set up by the regional government, based on the performance of the PCU as a whole, i.e. its capability to achieve the good management of the most relevant chronic diseases (e.g. diabetes).

The changes introduced by the PCU have initially generated a substantial degree of resistance from the side of GPs, and a sense of professional threat (Mitchell et al., 2011). As one GP candidly admitted: “The time when I was told we were going to work with nurses I could not sleep for two nights! We were used to be loners”. Conflicts around how the management of chronic diseases should be conducted and the respective roles of GPs and nurses have arisen. One GP said: “Things that were our responsibility have been left for nurses to do especially in the care of chronic conditions….Nurses should not dare to take certain clinical decisions on their own! They were given too much decisional autonomy”. On their side some nurses lamented that collaboration with GP was difficult,

especially in the beginning, to create: “Some GPs would not even refer to us their chronic patients to be followed up, they wanted to do everything on their own”. After the creation of the PCUs, GPs intensified the degree of communication and reciprocal exchange by organising GPs-only meetings, which have become the main (and only) occasion in which *all* GPs working in the same team convene in a structured and planned fashion. Not all GPs, though, felt, over time, so negative about working with other professionals: “Nurses have become fundamental in our work, we have continuous contact with them and they know each of our patients, so they make it possible to provide a much more complete service to our patients, especially for those suffering from chronic conditions that need to be followed continuously”.

In the present paper we set out to examine PCUs at two points in time: at the moment of their formation (first observation) and four years after their formation (second observation), so in the early phases of their evolution. By choosing this timeframe we think we are in the position to capture a situation in which social categorization processes and subgroup formation were at play within these teams, before better reciprocal knowledge among team members could develop and smoothen differences (Harrison et al., 2002). In particular, based on the theoretical model explained in the section about theory and hypotheses, we contend that GPs, when facing functional diversity, tend to form a GP-only subgroup[2] and increase the communication among themselves through GPs’ meetings (i.e., within-GP subgroup communication). In turn, it is this increased within-subgroup communication that leads to team members achieving the common goal of the good management of chronic diseases and patients, and, as such, to an improved team performance. This positive effect, though, is valid up to a point, beyond which a high frequency of within-GP subgroup communication becomes detrimental for PCU performance.

Methodology

Data sources

The data utilized for our analyses refer to 213 PCUs formed by GPs, nurses and specialist doctors. Data are collected through two main sources: 1) the administrative databases,

which record all prescriptions and examinations accessed by patients in primary care of the Italian region where the PCUs were created (for the variable “team performance”); and 2) an ad hoc survey, compiled by PCU coordinators every year, aimed at describing the PCUs, their care activities and meetings (for the variables “within-GP subgroup communication” and “PCU functional diversity”).

In this setting, selection bias is not an issue since the assignment of the GPs and the other professionals to the PCUs was based only on geographical proximity (first of all, of GPs’ practices) and not on members’ characteristics that may influence team performance. However, if team performance is not only the result of the mechanism hypothesized by our mediation model but also depends on pre-existing and independent characteristics of PCU members, our analysis could suffer from endogeneity. To address this issue, we collect and use in our models data for the variables described below for two points in time: $year_1$ (2006), that represents the baseline condition, and $year_2$ (2010), four years into the life of the PCUs. Our models, therefore, identify the contribution of PCU diversity and within-GP subgroup communication to the differential change in PCU performance comparing the situation at $year_2$ with the baseline observation ($year_1$). We eliminate the effects of invariable characteristics across the two years by imposing PCU-level fixed effects. Alternative specifications are also tested as robustness checks (see below).

Variables

Dependent variable: team performance The team performance is measured at the PCU level based on the capacity of team members to reach a common goal, namely the good management of diabetes. Diabetes care is ideal to evaluate team performance. Diabetes is a very common problem faced in primary care and has been, in a number of contexts, the first chronic condition around which multi-professional teams have been organized. In addition, the good management of diabetes, i.e. the benchmark of “best care”, has been standardized at international level over ten years ago, and this benchmark is (at least in theory) very well-known to healthcare professionals. The good management of diabetes requires patients to follow a specific clinical pathway, i.e. five well-defined steps in care, involving GPs, nurses and specialists.

The regional administrative databases from which the data are drawn contain information about the five steps of the clinical pathway that have to be completed every year by each diabetic patient. These steps include exams and diagnostics tests and their completion reflects the capacity of GPs, specialists and nurses to jointly provide the "best care" to each diabetic patient[3]. As a measurement of PCU performance, we use the proportion of diabetic patients who completed at least four out of five steps of the clinical pathway. The same or a similar measure of performance has already been utilized in other studies and is consolidated in the organizational literature on healthcare (e.g. Fantini et al., 2012; Hekman et al., 2009). This proportion was 35.8% at baseline, and rose to 46.7% in $year_2$.

Independent variable: team functional diversity In line with the definitions from Harrison and Klein (2007), we consider functional diversity in terms of professional *variety* within the PCU and consistently measure this variable using the Blau index (Blau, 1977), according to the formula $1 - \sum Pi^2$, where Pi is the proportion of the total team that each i-th professional category represents. The professional categories used are GPs, nurses and specialist doctors. Based on the number of categories, the Blau index for team functional diversity in this specific empirical setting varies between 0 (no diversity) and 0.75 (maximum diversity).

Mediator: within-GP subgroup communication This variable is assessed by measuring the number of meetings that GPs organize among themselves per year, weighted by the rate of GP participation. Our variable measures the frequency of the *formal* meetings organized by the GPs among themselves and does not take into account the possibility that spontaneous communication, such as calls, e-mails or informal conversations, might also play a role. Although we acknowledge that also informal communication can play a role, the reason for our choice is twofold. First, based on our observation of the empirical setting, these meetings are the sole occasion that the GPs, after the creation of the PCUs, have formalized to meet *all* together. Second, the fact that these meetings are formal is consistent with the finding in the literature that when a group is new and does not have a history of working together, as it is the case for the GPs in our empirical setting, group members will rely mainly on formal communication means (Smith et al., 1994). We

weight the number of meetings by the rate of GPs' participation to correct the frequency of communication measure for the actual possibility of interaction and exchange among GPs during their meetings. Other scholars have used uncorrected measures of frequency of communication at the team level (e.g. Ancona and Caldwell, 1992; Smith et al., 1994) but we think that adjusting for actual participation adds value to our measure.

Control variables In the fixed effects model we control for several confounding factors considering that some characteristics of the team (e.g., PCU geographical location and size) that do not vary between baseline and $year_2$ are already captured by the PCU fixed effects. For instance, we control for the PCU age and gender diversity, both measured using the Blau index, in order to disentangle the effects of demographic diversity from those of functional diversity. Other control variables are the number of patients, the number of diabetic patients, and the number of elderly patients (age above 65 years) served by the PCUs. All these can be considered measures of the "burden" of work and of illness faced by the teams, burden that has the potential to affect final team performance. In the random-effects model and in the cross-sectional one, used as robustness checks, we also include PCU size, measured as the number of team members. This variable is omitted in the fixed-effects model because it does not change between the two periods. Due to the collinearity between PCU size and the "burden" variables mentioned above, we standardize the variables per GP. Finally, we control for the proportion of GPs in the PCU that are also members of spontaneous group practices of 3-4 GPs each, since previous literature has found that such membership increases the likelihood of good management of chronic conditions (Fantini et al., 2012), and might also indicate a longer history of working together for some of the GPs in the PCU.

In the random effects model we add to the control variables the geographical location of the PCU (hill, countryside or mountain, with town as baseline) as it has been shown by previous studies (e.g. Fantini et al., 2012) that an urban setting tends to be accompanied by lower performances in the management of chronic conditions. We also control for the size of the PCU, i.e. the number of members, given that previous studies (e.g. Bantel, 1993; Smith et al., 1994) show it can influence team outcomes.

Descriptive statistics and correlations for all the variables are presented in Table 1.a and 1.b. Team performance, within-subgroup communication and functional diversity are correlated, consistent with a mediation hypothesis, while control variables do not display high correlation coefficients, even though some are significant with $p<0.05$. We tested multicollinearity using the variance-inflation factors (v.i.f., on the linear model) and the mean v.i.f. is 1.32 with a maximum of 1.81, therefore excluding multicollinearity issues.

Table 1.a Descriptive statistics

Variables	N	Mean	Standard Deviation
Team performance (variable 1) **Good management of diabetic patients (proportion of diabetic patients who have performed at least 4 out 5 steps in "best care")**	426	0.41	0.13
Team performance (variable 2) **Average number of steps in "best care" performed by each diabetic patient**	426	2.73	0.42
Within-subgroup communication **Number of GPs-only meetings by the rate of GP participation**	426	2.17	2.47
PCU functional diversity **(Blau index)**	426	0.08	0.13
Age diversity **(Blau index)**	426	0.47	0.10
Gender diversity **(Blau index)**	426	0.12	0.08
Group membership **Proportion of GPs members of a spontaneous group practice**	426	0.40	0.33
Number of elderly patients ***(>65 years old; x GP)***	426	289.35	42.88
Number of patients (x GP)	426	1,094.4	115.66
Number of diabetic patients ***(x GP)***	426	58.76	12.51
PCU geographical location	426	0.07	0.22
Mountain			
Countryside	426	0.40	0.48
Hill	426	0.34	0.48
PCU size **Number of team members**	426	14.87	5.15

*p<0.05

Table 2.b Correlation matrix

Variables		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Team performance (variable 1) **Good management of diabetic patients (proportion of diabetic patients who have performed at least 4 out 5 steps in "best care")**	(1)													
Team performance (variable 2) **Average number of steps in "best care" performed by each diabetic patient**	(2)	0.95*												
Within-subgroup communication **Number of GPs-only meetings by the rate of GP participation**	(3)	0.44*	0.44*											
PCU functional diversity **(Blau index)**	(4)	0.26*	0.26*	0.61*										
Age diversity **(Blau index)**	(5)	0.09	0.10*	0.09	-0.02									
Gender diversity **(Blau index)**	(6)	0.03	0.02	-0.03	0.01	-0.02								
Group membership	(7)	0.07	0.02	0.08	0.18*	0.00	-0.03							
Number of elderly patients ***(>65 years old; x GP)***	(8)	-0.02	-0.03	-0.18*	-0.08	-0.04	-0.09	0.02						
Number of patients (x GP)	(9)	0.13*	0.14*	0.19*	0.15*	-0.13*	-0.12*	0.10*	-0.24*					
Number of diabetic patients ***(x GP)***	(10)	0.35*	0.30*	0.36*	0.27*	-0.08	-0.02	0.17*	0.23*	0.43*				
PCU geographical location	(11)	0.10*	0.14*	0.02	0.10*	0.01	-0.06	0.07	0.31*	-0.11*	0.03			
Mountain														
Countryside	(12)	0.07	0.07	0.00	0.02	0.08	-0.08	0.00	-0.23*	0.14*	0.02	-0.25*		
Hill	(13)	-0.11*	-0.11*	0.02	0.01	0.05	0.13*	-0.01	-0.12*	0.05	-0.02	0.01	-0.38*	
PCU size	(14)	0.06	0.04	0.04	-0.21*	0.06	0.08	-0.16*	-0.03	-0.01	-0.06	-0.31*	-0.15*	-0.07

*p<0.05

Analysis

To test our hypotheses, we use a fixed-effects regression analysis on two years. This means that all the variables that do not change between $year_1$ (baseline) and $year_2$ are not included in the model and are captured by the PCU fixed-effects. Models are compared using the log-likelihood ratio test for nested models as well as three commonly accepted tests (Schwarz, 1978). Because we hypothesize a mediation effect (Hypothesis 3), in testing for mediation we follow the four-step procedure by Baron and Kenny (1986), complemented by the Sobel-Goodman test (Sobel, 1982) and by a bootstrap estimation of both direct and indirect effects with 5,000 repetitions (Bollen and Stine, 1990; Shrout and Bolger, 2002). To test the curvilinear relationship between within-subgroup communication and team performance we use the quadratic approach, suggested by Busse et al. (2015) for studying a "too-much-of-a-good-thing effect".

Robustness checks

To verify the robustness of our analyses we perform several robustness checks. First, we test an alternative measure of team performance using the average number of steps completed by a diabetic patient by PCU. Differently from the "good management" variable, this variable takes into account all the levels of team performance, not only those closer to the target of "best care". Second, we estimate a random effects model on the two years, introducing two additional controls: PCU location and PCU size. The random effects model does not eliminate the possibility of an effect of the time-invariant characteristics and allows between-PCUs estimation of the effects. Third, we estimate a cross sectional model ($year_2$ only) to verify that the patterns identified in the two-periods model are also found in a non-panel, pure between-analysis.

Results

The mediating role of within-subgroup communication

The results of the hypothesis testing are summarised in Table 2. Model 1 shows that the coefficient for PCU functional diversity is positive and significant ($\beta=0.184$, $p<0.01$), indicating that the overall direct effect of PCU functional diversity on PCU performance

is positive. Model 2 shows that PCU functional diversity significantly increases within-GP subgroup communication (β=10.679, $p<0.01$), so that our hypothesis 1 is supported. Model 3 includes both PCU functional diversity and within-GP subgroup communication and tests both hypothesis 2 and the mediation model (hypothesis 3). Within-GP subgroup communication shows a positive and significant coefficient (β=0.009, $p<0.01$), consistently with hypothesis 2. The coefficient for PCU functional diversity is reduced in magnitude compared to Model 1 and turns to be not significant, supporting the mediation role of within-subgroup communication.

In Model 4 the squared term of within-GP subgroup communication is added to test for the curvilinear nature of the relationship. Consistent with our hypothesis 3, the coefficient is negative and significant (β=-0.003, $p<0.01$). A simulation of the relationship (Figure 1) shows that the estimated frequency of within-GP subgroup communication beyond which team performance starts decreasing is 5.7 meetings (considering the participation by all GPs).

Figure 1. Simulation of the curvilinear relationship between within-subgroup communication and team performance

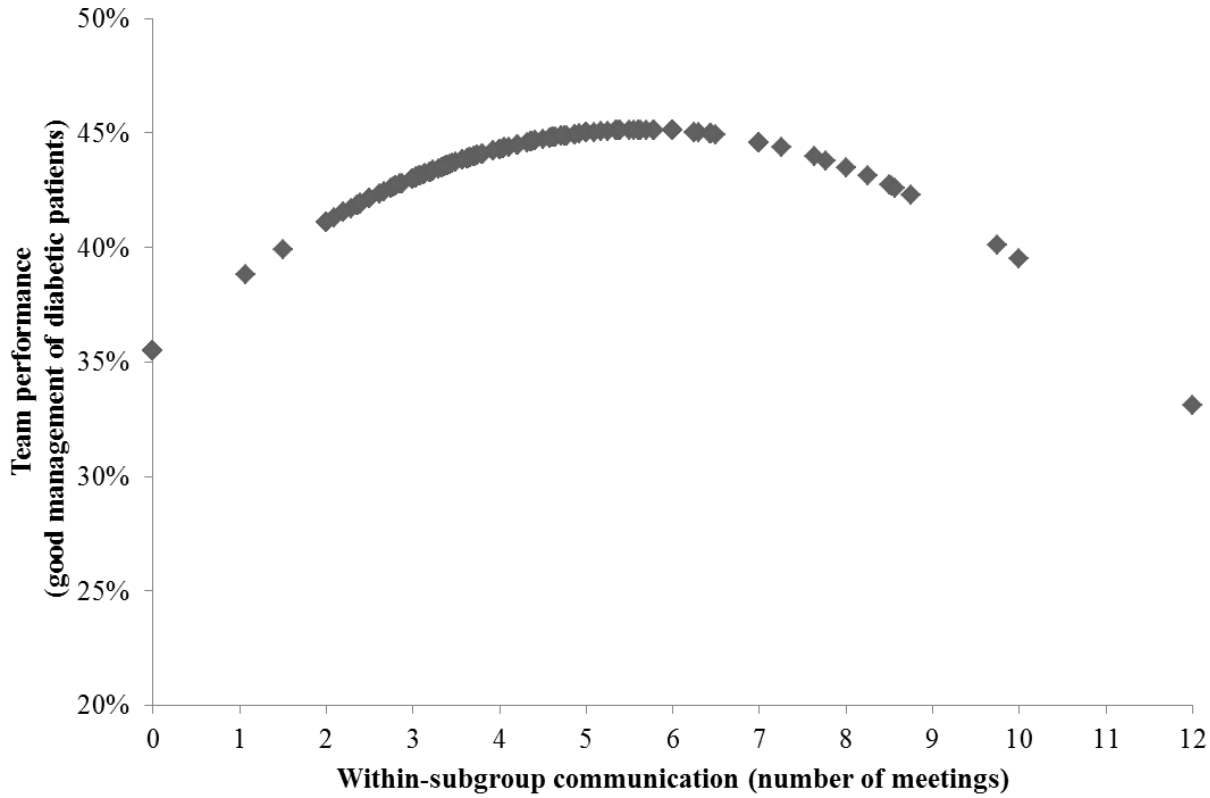


Table 2. Fixed-effects model of relationship between team functional diversity, within-subgroup communication and team performance

Variables	(1) Team performance: Good management of diabetic patients	(2) Within-subgroup communication	(3) Team performance: Good management of diabetic patients	(4) Team performance: Good management of diabetic patients
Ind.variable				
PCU functional diversity	0.184***	10.679***	0.086	0.003
Mediator				
Within-GP subgroup communication			0.009***	0.034***
Within-GP subgroup communication (squared)				-0.003***
Control variables				
Age diversity	-0.080	-1.202	-0.069	-0.064
Gender diversity	0.840	16.585	0.688	0.552
Average number of patients per GP (x100)	-0.000	-0.001	-0.000	-0.000
Number of elderly patients (>65 years old)	0.000*	0.003***	0.000	0.000
Average number of diabetic patients per GP	0.005***	0.085***	0.004***	0.003***
GPs' group membership	-0.271	-8.070	-0.197	-0.140
Constant	0.104	-14.384**	0.237	0.355
Observations (PCU-year)	426	426	426	426
R-squared within	0.488	0.747	0.506	0.533
Number of PCUs	213	213	213	213
Log-likelihood	623.0	-670.3	631.0	642.9
Log-likelihood test of nested models (deg. of freedom – Log-likelihood ratio)	-	-	1 – 15.91***	1-23.83***
Akaike Information Criterion	-1230.046	1356.597	-1243.953	-1265.787
Bayesian Information Criterion	-1197.611	1389.032	-1207.463	-1225.242
Consistent Akaike Information Criterion	-1189.611	1397.032	-1198.463	-1215.242

*p<0.1, **p<0.05, ***p<0.01

Overall, our model positing the mediation effect of within-subgroup communication in the relationship between team functional diversity and team performance is supported.

The Sobel-Goodman test supports full mediation ($z=4.015$, $p<0.01$), with a 98.13% of the effect mediated. The bootstrap estimation (5,000 replications) confirms the Sobel test with a statistical significance of the indirect effect of $p<0.01$. The total effect of team functional diversity on team performance is 0.159 ($p<0.05$), the direct effect is 0.003 (not significant) and the indirect effect is 0.156 ($p<0.01$). The reverse causality test, or, in other words, the Sobel test calculated switching the mediator and the independent variable, is not significant ($p=-0.08$), providing further support for the hypothesized mediation.

As for the robustness checks (see Supplementary Material), the alternative measure of performance did not alter the sign of the coefficients, as well as the mediation effect maintained. The random effects model shows the same result pattern. The Sobel test also supports full mediation with 94.46% of the effect mediated ($z=2.95$, $p<0.01$). Finally, the cross-sectional model shows that the effect of PCU functional diversity on PCU performance is totally mediated by within-GP subgroup communication, and in the complete model there is evidence of a so-called “inconsistent mediation”, i.e. when direct and indirect effects have opposite signs, and the mediator has such a strong effect that is able to revert the sign of the direct effect (MacKinnon et al., 2007). The Sobel test and the bootstrap estimation are significant and the mediation model is confirmed also in this case. The coefficient of the curvilinear term is negative, as expected, but not statistically significant.

Discussion

Several authors have suggested that temporal factors can modulate the relationship between functional diversity and team performance (Jackson et al, 2003; Harrison, et al., 2002; Pelled et al, 1999). At times when teams have been just recently formed and reciprocal knowledge among members is still weak (Harrison et al., 2002), the members’ professional background might be a particularly salient attribute triggering social categorization processes and the formation of subgroups, accompanied by in-group favouritism and a negative bias towards the “out-group” (Jackson et al, 2003; Pelled et al, 1999; Thatcher and Patel, 2012).

Yet, the literature so far has paid little attention to the early phases of the life of functionally diverse teams. In the attempt to address this neglected issue, in the present study we observe 213 functionally diverse teams a few years into their life. We choose an empirical context, i.e. primary care, where multi-professional work is a novelty. In addition, in this specific setting, the status differentials between doctors and nurses (Currie at al., 2012), and the GPs' sense of being professionally threatened (Hornsey and Hogg, 2000; Mitchell et al, 2011) when having to work with other professions, might have further facilitated social categorization processes and the formation of GPs-only subgroups within these teams (Saguy et al., 2008). Despite the fact that we cannot be certain that our results are generalizable to other settings, they might be particularly informative when dealing with highly professionalized contexts or sectors (Somech, 2006; Currie and White, 2012), characterised by the presence of multiple well-established occupations or of distinct functional units, for whom starting to work together might be especially problematic.

The study shows that, even in a situation that could be defined of amplified reaction to diversity, subgroup formation is *per se* not detrimental to team performance. This is consistent with what has been proposed by other scholars (Bezrukova et al., 2009; Gibson and Vermeulen, 2004). Indeed, the subgroup allows the team (up to a point) to reap the benefits of the diversity in professions and expertise, and to translate it into an improved team performance.

In this paper we provide three main contributions to the literature on functionally diverse teams and subgroups. First, we identify a mechanism, i.e. within-subgroup communication, that occurs at an intermediate level of aggregation between the individual and the team, and that links team functional diversity to performance. This finding points to the fact that the elaboration of a reaction to functional diversity is not only the result of processes occurring at an individual level and resulting in a series of cognitive (Milliken et al., 2003) as well affective responses (Garcia-Prieto et al., 2003). Nor it is something that can be dealt with exclusively at the team level, as suggested by most of the literature on diversity so far (e.g. Brown and Hewstone, 2005; Lovelace et al., 2001; Pettigrew and Tropp, 2013; Schippers et al., 2003). Instead, we propose that, due to the easiness of communication among people who share a common language (Mitchell et al, 2011), and

the fact that they feel free to express their opinions (Edmonson, 2003), a professionally-homogenous subgroup might work as a suitable venue for elaborating on team goals and for providing solutions to organizational issues arising within the team. Our findings hint to the possibility that the subgroup might even promote the engagement of the rest of the team, after having elaborated internally a better appreciation of the "who" and the "what" of each profession within the team (Cramton and Hinds, 2003; Hewstone and Brown, 1986). Further research will need to explore the exact mechanisms, and the boundary conditions, that account for the transformation of subgroup formation into something beneficial for team performance.

Second, our study gives relevance to the relational *process* of the communicational exchanges among subgroup members. In this way we further stress the importance of relational mechanisms, such as those based on communication, in modern work settings (Grant and Parker, 2009) and their relevance for understanding performance. In addition, by focusing on the behaviour of subgroup members we complement the work of other scholars (Bezrukova et al., 2009; Gibson and Vermeulen, 2004; Molleman, 2005), who have mainly characterised the subgroups based on the attributes (and their combinations) of subgroup members. In other words, these scholars have been concerned with who forms the subgroup, but less with what these individuals do in the subgroup. For instance, according to Gibson and Vermeulen (2004), a subgroup will be "strong" or "weak" depending on the pre-existing characteristics of the individual members and the degree of their overlap. In our case, instead, we conceive of the subgroup as socially constructed in the moment in which individuals start communicating and meeting among themselves, in a manner that is, therefore, contingent to subgroup formation. Individual attributes and social behaviour are bound to be interrelated, though, and it is well possible that attributes, and their overlap, will influence (positively or negatively) the frequency of communication within the subgroup, an aspect that requires further empirical testing in future research.

Finally, although the overall effect of within-subgroup communication is positive, in this paper we also show that, beyond certain levels, within-subgroup communication can work against team performance. This finding can partially account for the long-standing issue of contrasting results provided by the literature with respect to the impact of

diversity on team performance (e.g. Bowers et al., 2000; Horwitz and Horwitz, 2007; Jackson et al., 2003). It confirms the idea that diversity is indeed a "double-edge sword" (Milliken and Martins, 1996), and that, instead of searching for a definitive answer, researchers might want to understand better the conditions in which diversity works for the benefit of final team performance and those in which, instead, it does the opposite (Milliken and Martins, 1996).

Our paper shows that within-subgroup communication is a strong mediator of the relationship between functional diversity and team performance. As such, the set of conditions that determine whether within-subgroup communication occurs, and, even more importantly, to what extent, are important to explain the final effects of diversity on team performance. Our findings indicate, for instance, that for high levels of team functional diversity the frequency of within-subgroup communication rises sharply to those levels that are detrimental for team performance. These levels of within-subgroup communication have negative effects probably because they are associated with the strong polarization and closure of the subgroup in comparison to the rest of the team (Abrams et al., 2010; Lau and Murnighan, 2005). These findings allow speculating that, in teams that have been newly formed, a high (or maximum) level of functional diversity might be less likely accompanied by a good team performance. The interplay between functional diversity and team performance over time needs further empirical exploration and within-subgroup communication has the potential to a good way into examining this phenomenon.

Implications for Management Practice

At present managers strongly promote the establishment in work settings of functionally diverse teams with the aim of improving overall performance (Grant and Parker, 2009; Parker, 2003). Most of the time, managers try from the very start to facilitate team-level mechanisms, such as joint meetings (Reay et al., 2013) and joint projects, and to stimulate contact and communication among diverse team members. However, these efforts are not always successful (Ancona and Caldwell, 1992; Schippers et al., 2003). Schippers and colleagues (2003) propose that only if reflexivity is generated in team-level meetings they are truly beneficial to the team and this might be possible only when the capacity to

jointly reflect upon diversity is facilitated by better reciprocal knowledge (Harrison et al., 2002). In the early phases after team formation, therefore, our study suggests that it is possible (and maybe advisable) to take into account the virtues of building and facilitating communication within subgroups of individuals of the same profession. Within-subgroup communication might work, in other words, as a valid preparatory process to subsequent collaboration among diverse team members. To paraphrase Brown and Hewstone (2005, p. 266), we suggest that, unless interaction can first be characterised as inter-group (i.e., between *distinct* subgroups), any positive outcome of contact at the team level will be primarily cosmetic and will leave divisive and conflictual relations in the team unchanged.

Conclusions

In this paper, we have identified a mechanism, within-subgroup communication, that mediates the relationship between team functional diversity and team performance. We show that communication among members of a professionally-homogenous subgroup can work for the benefit of the overall team. Nevertheless, the balance is subtle and high levels of within-subgroup communication can easily turn in “too-much-of-a-good-thing”. The overriding message of this paper is that the boundary conditions that modulate within-subgroup communication are bound to be of great importance for the impact that functional diversity has on final team performance.

Notes

1. It is to be noted that that subgroups can theoretically form only in teams of so-called moderate diversity (Gibson and Vermuelen, 2003; Harrison and Klein, 2007), where the profession/s forming the subgroup/s are represented by at least two or more individuals. These teams are far from being rare in modern work settings and have often been described in the literature (e.g. Edmonson, 2003; Gibson and Vermuelen, 2003; Somech, 2006). In these cases, team functional diversity might increase in two ways: 1) when members become more equally distributed across professions, i.e. the depth of diversity increases; 2) when individuals belonging to additional professions join the team, i.e. the scope of diversity increases.

2. The literature on social categorization suggests that one or more subgroups can form within a diverse team. In our setting we analyze empirically the formation of one subgroup (GPs only). We do not explore whether nurses and specialists split themselves further into subgroups, rather, for the purpose of this paper, we consider them as forming together the “out-group”.

3. Diabetic patients are identified through the regional administrative databases based on their drug regimen (at least one prescription of insulin or oral antidiabetics in the last two years) or their discharge from hospital (diagnostic code 250* indicative of diabetes in the last two years). The examinations and tests that constitute the steps in “best care” are those recommended by the regional (and international) clinical guidelines for diabetes care, i.e. glycated haemoglobin, microalbuminuria, creatinine clearance, a lipid profile, and an electrocardiogram. Each diabetic patient has to complete every year all five steps in best care.

References

Abrams D, Wetherell M, Cochrane S, Hogg MA and Turner JC (1990) Knowing what to think by knowing who you are: Self-categorization and the nature of norm formation, conformity and group polarization. *British Journal of Social Psychology* 29: 97–119.

Allport GW (1954) *The nature of prejudice*. Reading, MA: Addison-Wesley.

Ancona DG and Caldwell DF (1992) Demography and design: Predictors of new product team performance. *Organization Science* 3: 321–341.

Armeni P, Compagni A and Longo F (2014) Multiprofessional primary care units: What affects the clinical performance of Italian general practitioners?. *Medical Care Research and Review* 71(4): 315-336.

Asch SE (1956) Studies of independence and conformity: I. A minority of one against unanimous majority. *Psychological monographs: General and applied* 70 (9): 1-70.

Baron RM and Kenny DA (1986) The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations'. *Journal of Personality and Social Psychology*, 51(6): 1173-1182.

Bantel KA (1993) Strategic clarity in banking: role of top management team demography. *Psychological Reports* 73: 1187–1201.

Bezrukova K, Jehn KA, Zanutto EL and Thatcher SMB (2009) Do workgroup faultlines help or hurt? A moderated model of faultlines, team identification, and group performance. *Organization Science* 20(1): 35-50.

Blau PM (1977) *Inequality and Heterogeneity: A Primitive Theory of Social Structure.* New York: Free Press.

Bollen K A and Stine R (1990) Direct and indirect effects: Classical and bootstrap estimates of variability. *Sociological Methodology* 20: 115-140.

Bojadzievski T and Gabbay R A (2011) Patient-centered medical home and diabetes. *Diabetes Care* 34(4): 1047-105.

Bowers CA, Pharmer JA and Salas E (2000) When member homogeneity is needed in work teams: A meta-analysis. *Small Group Research* 31(3): 305-327.

Brewer MB (1979) In-group bias in the minimal intergroup situation: A cognitive motivational analysis. *Psychological Bulletin* 86(2): 307-324.

Brewer M.B (1999) The psychology of prejudice: Ingroup love or outgroup hate? *Journal of Social Issues* 55(3): 429–444.

Brown R and Hewstone M (2005) An integrative theory of intergroup contact. *Advances in Experimental Social Psychology* 37: 255–343.

Bunderson JS and Reagans RE (2011) Power, status, and learning in organizations. *Organization Science* 22(5): 1182-1194.

Bunderson JS and Sutcliffe KM (2002) Comparing alternative conceptualizations of functional diversity in management teams: Process and performance effects. *Academy of Management Journal*, 45(5): 875-893.

Busse C, Mahlendorf MD and Bode C (2015) The ABC for studying the too-much-of-a good thing effect: a competitive mediation framework linking antecedents, benefits, and costs. *Organizational Research Methods* 1094428115579699, first published on April 24, 2015.

Byrne DE (1971) *The attraction paradigm.* New York: Academic Press.

Carton AM and Cummings JN (2012) A Theory of Subgroups in Work Teams, *Academy of Management Review* 37(3): 441-470.

Carton AM and Cummings JN (2013) The Impact of Subgroup Type and Subgroup Configurational Properties on Work Team Performance, *Journal of Apllied Psychology*, 98(5): 732-758

Chreim S, Williams BE and Hinings CR (2007) Interlevel influences on the reconstruction of professional role identity. *Academy of Management Journal*, 50(6): 1515-1539.

Cronin MA and Weingart LR (2007) Representational gaps, information processing, and conflict in functionally diverse teams**.** *Academy of Management Review* 32(3): 761-773.

Currie G and White L (2012) Inter-professional barriers and knowledge brokering in an organizational context: The case of healthcare. *Organization Studies* 33(10): 1333-1361.

Currie G, Lockett A, Finn R, Martin G and Waring J (2012) Institutional work to maintain professional power: Recreating the model of medical professionalism. *Organization Studies* 33(7): 937-962.

Donnellon A, Gray B and Bougon MG (1986) Communication, meaning, and organized action. *Administrative Science Quarterly* 31(1): 43-55.

Dovidio JF, Saguy T and Shnabel N (2009) Cooperation and conflict within groups: Bridging intragroup and intergroup processes. *Journal of Social Issue* 65(2): 429-449.

Cramton CD and Hinds PJ (2003) Subgroup dynamics in internationally distributed teams: ethnocentrism or cross-national learning? *Research in Organizational Behavior* 26: 231-263.

Earley PC and Mosakowski E (2000) Creating hybrid team cultures: An empirical test of transnational team functioning. *Academy of Management Journal* 43(1): 26-49.

Edmondson A (1999) Psychological safety and learning behavior in work teams. *Administrative Science Quarterly* 44(2): 350–38.

Edmondson AC (2003) Speaking up in the operating room: How team leaders promote learning in interdisciplinary action teams. *Journal of Management Studies* 40(6): 1419–1452.

Fantini MP, Compagni A, Rucci P, Mimmi S and Longo F (2012) General practitioners' adherence to evidence-based guidelines: A multilevel analysis. *Health Care Management Review* 37(1): 67–76.

Friedson E (1986) *Professional powers*. Chicago: The University of Chicago Press.

Garcia-Prieto P, Bellard E and Schneider SC (2003) Experiencing diversity, conflict, and emotions in teams. *Applied Psychology* 52(3): 413-440.

Gibson C and Vermeulen F (2003). A healthy divide: Subgroups as a stimulus for team learning behavior. *Administrative Science Quarterly* 48(2): 202-239.

Grant A and Parker S (2009) Redesigning work design theories: The rise of relational and proactive perspectives. *Academy of Management Annals* 3(1): 317-375.

Harrison DA and Klein KJ (2007) What's the difference? Diversity constructs as separation, variety, or disparity in organizations. *Academy of Management Review* 32(4): 1199-1228.

Harrison DA, Price KH, Gavin JH and Florey AT (2002) Time, teams, and task performance: Changing effects of surface- and deep-level diversity on group functioning. *Academy of Management Journal* 45(1): 1029-1045.

Hewstone M and Brown R (1986) Contact is not enough: An intergroup perspective on the 'contact hypothesis' In: Hewstone M and Brown R (eds), *Contact and Conflict in Intergroup Encounters*. Oxford: Blackwell, 1–43.

Horwitz SK and Horwitz IB (2007) The effects of team diversity on team outcomes: A meta analytic review of team demography. *Journal of Management* 33(6): 987-1015.

Jackson SE (1995) Consequences of diversity in multidisciplinary work teams. In: West MA (ed), *Handbook of Work Group Psychology*. Chichester: Wiley, 53-75.

Jackson SE, Joshi A, and Erhardt NL (2003) Recent research on team and organizational diversity: SWOT analysis and implications. *Journal of Management* 29 (6): 801–830.

Jehn KA (1995) A multimethod examination of the benefits and detriments of intragroup conflict. *Administrative Science Quarterly* 40(2): 256-282.

Jehn K.A. (1997). A qualitative analysis of conflict types and dimensions in organizational groups. *Administrative Science Quarterly* 42(3): 530-557.

Jehn KA, Chadwick C and Thatcher SMB (1997) To agree or not to agree: The effects of value congruence, individual demographic dissimilarity, and conflict on workgroup outcomes. *International Journal of Conflict Management* 8(4): 287–305.

Jehn KE, Northcraft GB and Neale MA (1999) Why differences make a difference: A field study

of diversity, conflict, and performance in work groups. *Administrative Science Quarterly* 44(4): 741–763.

Kossinets G and Watts DJ (2009) Origins of homophily in an evolving social network. *American Journal of Sociology* 115(2): 405-450.

Lant TK, Milliken FJ and Batra B (1992) The role of managerial learning and interpretation in strategic persistence and reorientation: an empirical exploration. *Strategic Management Journal* 13: 585–608.

Lau DC and Murnighan JK (1998) Demographic diversity and faultlines: The compositional dynamics of organizational groups. *Academy of Management Journal* 23(2): 325–340.

Lau DC and Murnighan JK (2005) Interactions within groups and subgroups: The effects of demographic faultlines. *Academy of Management Journal* 48(4): 645-659.

Lawrence BS (1997) The black box of organizational demography. *Organization Science* 8:1-22.

Lazega E (2000) Rule enforcement among peers: A lateral control regime. *Organization Studies* 21(1): 193-214.

Lovelace K, Shapiro DL and Weingart LR (2001) Maximizing cross-functional new product teams' innovativeness and constraint adherence: A conflict communications perspective. *Academy of Management Journal* 44(4): 779-793.

MacKinnon DP, Fairchild AJ and Fritz MS (2007) Mediation analysis. *Annual Review of Psychology* 58*:* 593-614.

Majchrzak A, More PHB and Faraj S (2012) Transcending knowledge differences in cross functional teams. *Organization Science* 23(4): 951-970.

McPherson M, Smith-Lovin L and Cook JM (2001) Birds of a feather: Homophily in social networks. *Annual Review of Sociology* 27: 415-444.

Milliken FJ, Bartel CA and Kurtzberg T (2003) Diversity and creativity in work groups: A dynamic perspective on the affective and cognitive processes that link diversity and performance. In: Paulus PB and Nijstad BA (eds.), *Group creativity: Innovation through collaboration.* New York: Oxford University Press, 32-62.

Milliken FJ and Martins LL (1996) Searching for common threads: Understanding the multiple effects of diversity in organizational groups. *Academy of Management Review* 21: 402-433.

Mitchell R, Parker V, Giles M and White N (2010) Toward realizing the potential of diversity in

composition of functional health care teams: An examination of the cognitive and psychosocial

dynamics of functional collaboration. *Medical Care Research and Review* 67(1): 3-26.

Mitchell RJ, Parker V and Giles M (2011) When do functional teams succeed? Investigating the moderating roles of team and professional identity in functional effectiveness. *Human Relations*, 64(10): 1321-1343.

Molleman E (2005) Diversity in demographic characteristics, abilities and personality traits: Do faultlines affect team functioning?. *Group Decision and Negotiation* 14(3): 173-193.

Pelled LH (1996) Demographic diversity, conflict, and work group outcomes: An intervening process theory. *Organization Science* 7(6): 615-631.

Pelled LH, Eisenhardt KM and Xin KR (1999) Exploring the black box: An analysis of work group diversity, conflict, and performance. *Administrative Science Quarterly* 44(1): 1–28.

Pettigrew TF (1998) Intergroup contact theory. *Annual Review of Psychology* 49(1): 65 -85.

Pettigrew TF and Tropp LR (2013) *When groups meet: The dynamics of intergroup contact.* New York: Psychology Press.

Powell WW (1990) Neither market nor hierarchy: Network forms of organization. In: Staw BM and Sutton R (eds) *Research in Organizational Behavior***.** Greenwich: JAI, 295-336.

Reay T, Chreim S, Golden -Biddle K, G
and Hinings CR (2013) Transforming new ideas into practice: An activity based perspective on the institutionalization of practices. *Journal of Management Studies* 50(6): 963-990.

Saguy T, Dovidio JF and Pratto F (2008) Beyond contact: Intergroup contact in the context of power relations. *Personality and Social Psychology Bulletin* 34(3): 432-445.

Schippers MC, Den Hartog DN, Koopman PL and Wienk JA (2003) Diversity and team outcomes: The moderating effects of outcome interdependence and group longevity and the mediating effect of reflexivity. *Journal of Organizational Behaviour* 24(6): 779–802.

Schwarz G (1978) Estimating the dimension of a model. *Annals of Statistics* 6(2): 461-464.

Shrout PE and Bolger N (2002) Mediation in experimental and non experimental studies: New procedures and recommendations. *Psychological Methods* 7(4): 422-445.

Sobel ME (1982) Asymptotic confidence intervals for indirect effects in structural equation models. In: Leinhardt S (ed.) *Sociological Methodology*. Washington, DC: American Sociological Association, 290-312.

Somech A (2006) The effects of leadership style and team process on performance and innovation in functionally heterogeneous teams. *Journal of Management* 32(1): 132-157.

Smith KG, Smith KA, Olian JD, Sims HP, O'Bannon DP and Scully JA (1994) Top management team demography and process: The role of social integration and communication. *Administrative Science Quarterly* 39(3): 412–438.

Skevington SM (1980) Intergroup relations and social change within a nursing context. *British Journal of Social and Clinical Psychology* 19(3): 201-213.

Tajfel H (1982) *Social identity and intergroup relations.* Cambridge: Cambridge Univ Press.

Tajfel H and Turner JC (1986) The social identity theory of intergroup conflict. In: Worchel S and Austin WG (eds) *Psychology of intergroup relations.* Chicago: Nelson Hall, 7-24.

Turner JC, Hogg MA, Oakes PJ, Reicher SD and Wetherell MS (1987) *Rediscovering the social group: A self-categorization theory.* Cambridge: Basil Blackwell.

Thatcher SMB and Patel PC (2012) Group faultlines: A review, integration, and guide to future research. *Journal of Management* 38(4): 969-1009.

van Knippenberg D, De Dreu CKW and Homan AC (2004) Work group diversity and group performance: An integrative model and research agenda. *Journal of Applied Psychology* 89(6): 1008-1022.

van Knippenberg D and Schippers MC (2007) Work group diversity. *Annual Review of Psychology* 58: 515 -541.

Webber SS and Donahue LM (2001) Impact of highly and less job-related diversity on work group cohesion and performance: A meta-analysis. *Journal of Management* 27(2): 141-162.

Williams KY and O'Reilly CA (1998) Demography and diversity in organizations: A review of 40 years of research. In: Staw BM and Sutton R (eds.) *Research in Organizational Behavior*. Greenwich: JAI, 77-140.

Supplementary Material: Robustness checks

Table A. Random effects model

Variables	(1) Team performance: Good management of diabetic patients	(2) Within-subgroup communication	(3) Team performance: Good management of diabetic patients	(4) Team performance: Good management of diabetic patients
Independent variable				
PCU functional diversity	0.214***	11.078***	0.034	-0.008
Mediator				
Within-GP subgroup communication			0.015***	0.029***
Control variables				
Within-GP subgroup communication (squared)				-0.002***
Age diversity	0.096	1.767**	0.066	0.072
Gender diversity	0.014	-3.586	0.098	0.096
Location: countryside vs town	0.021	0.003	0.021	0.023
PCU location: mountain vs town	0.079*	0.150	0.079*	0.086**
Location: hill vs town	-0.031	0.119	-0.033*	-0.030
PCU size	0.008*	0.193***	0.007	0.007
Number of patients (x GP)	0.000	0.001	-0.000	0.000
Number of elderly patients (>65 years old; x GP)	-0.000	-0.000**	-0.000	-0.000
Number of diabetic patients (x GP)	0.005***	0.052***	0.003***	0.003***
GPs' group membership	-0.014	-0.360	-0.004	0.006
Constant	0.547	2.069	0.457	0.377
Observations (PCU-year)	426	426	426	426
R-squared between	0.108	0.073	0.158	0.138
N. observations (PCUs)	213	213	213	213

*p<0.1, **p<0.05, ***p<0.01

Table B. Cross sectional analysis ($year_2$ only)

Variables	(1) Team performance: Good management of diabetic patients	(2) Within-subgroup communication	(3) Team performance: Good management of diabetic patients	(4) Team performance: Good management of diabetic patients
Independent variable				
PCU functional diversity	0.024	1.651**	-0.010	-0.014
Mediator				
Within-GP subgroup communication			0.021***	0.032**
Control variables				
Within-GP subgroup communication (squared)				-0.001
Age diversity	0.109	2.249**	0.063	0.063
Gender diversity	0.153	-2.947**	0.214**	0.209**
PCU location: countryside vs town	0.037*	0.089	0.035	0.036*
Location: mountain vs town	0.083**	0.935	0.063	0.064
Location: hill vs town	-0.007	0.285	-0.013	-0.011
PCU size	-0.001	0.224**	-0.005	-0.005
Number of patients (x GP)	-0.000	0.003***	-0.000	-0.000
Number of elderly patients (>65 years old; x GP)	0.000	-0.001**	0.000	0.000
Number of diabetic patients (x GP)	0.001	0.003	0.001	0.001
GPs' group membership	0.001	1.192***	-0.023	-0.024
Constant	0.306**	-1.210	0.331***	0.307**
N. observations (PCUs)	213	213	213	213
R-squared	0.053	0.184	0.111	0.112

*p<0.1, **p<0.05, ***p<0.01

Table C. Fixed effects model with alternative variable for team performance

Variables	(1) Team Performance: Number of steps in best care per patient	(2) Within-subgroup communication	(3) Team Performance: Number of steps in best care per patient	(4) Team Performance: Number of steps in best care per patient
Independent variable				
PCU Functional diversity	0.642***	10.679***	0.273	-0.016
Mediator				
Within-GP subgroup communication			0.035***	0.119***
Control variables				
Within-GP subgroup communication (squared)				-0.011***
Age diversity	-0.476	-1.202	-0.435	-0.418
Gender diversity	2.999	16.585	2.425	1.955
Number of patients (x GP)	-0.001	-0.001	-0.001	-0.001
Number of elderly patients (>65 years old; x GP)	0.000**	0.003***	0.000	0.000
Number of diabetic patients (x GP)	0.014***	0.085***	0.011***	0.007***
GPs' group membership	-0.166	-8.070	0.113	0.311
Constant	1.538	-14.384**	2.036**	2.446**
Observations (PCU-year)	426	426	426	426
R-squared within	0.425	0.747	0.449	0.478
Number of PCUs	213	213	213	213
Log-likelihood	87.50	-670.3	96.65	108.3
Log-likelihood test of nested models (deg. of freedom – Log-likelihood ratio)	-	-	1 – 18.30***	1-23.31***
Akaike Information Criterion	-159.003	1356.597	-175.307	-196.617
Bayesian Information Criterion	-126.568	1389.032	-138.817	-156.073
Consistent Akaike Information Criterion	-118.568	1397.032	-129.817	146.073

*p<0.1, **p<0.05, ***p<0.01

STUDY III

HELPING FRIENDS BUT NOT FOES:

TRADE-OFFS BETWEEN JOINT PERFORMANCE AND ADVANTAGE AT DIFFERENT LEVELS OF BROKERAGE

Patrizio Armeni

1. Introduction

Negative affective ties in the workplace exist. Competition, inappropriate expectations and negative past experience are some of their antecedents (Kiefer 2005, Li, Zhou et al. 2011, Duffy, Lee et al. 2012). Their consequences are negative both on behaviors and performance, but still, negative ties survive and persist. This research aims at providing a framework in which negative ties have contrasting effects and could, therefore, be kept active on purpose. In particular, we propose that negative ties are detrimental for collective outcomes but are also a possible source of advantage for individuals.

Prior literature has shown that positive and negative affective ties in the workplace are important activators of prosocial behaviors (e.g. Labianca, Brass et al. 1998, Bowler and Brass 2006, Labianca and Brass 2006). Friendship, especially when perceived as a strong tie, was a positive predictor of both receipt and performance of interpersonal citizenship (Bowler and Brass 2006). Negative ties generate the opposite effect, reducing the level of desirable behaviors (Labianca, Brass et al. 1998). The same directional effects are reported on performance (Duffy, Lee et al. 2012, Venkataramani, Labianca et al. 2013).

Social exchange theory (Homans 1958, Emerson 1976) provides a convenient set of propositions to explain the interpersonal behaviors of individuals when affective states and “costly” behaviors (e.g. helping) are concerned. Building on social exchange theory, Bowler and Brass (2006) studied the impact of different types of ties and social embeddedness on performance and receipt of interpersonal citizenship (Bowler and Brass 2006). Moving from similar arguments, we extend the impact of affective ties to include

interpersonal citizenship behaviors (ICB), collective performance and advantage. More in detail, we propose that affective ties influence ICB. However, ICB engages the performer in time-consuming activities and could generate a potential reduction of knowledge gaps between the person performing ICB and the receiver. Even if such behaviors are desirable for organizations, individuals may perceive an internal resistance to endow colleagues with valuable knowledge through help. In other words, there could be a trade-off between the joint performance after help and the simultaneous loss of competitive advantage for the individual performing ICB. To empirically test our hypotheses, we collected longitudinal social network and performance data on a post-graduate master class. The paper is structured as follows: section 2 includes the theory and the hypotheses development; section 3 describes data and methods; section 4 presents the results and limitations; the discussion and managerial implications are included in section 5.

2. Hypotheses development

The impact of affective ties on ICB

Social exchange theory (Homans 1958, Emerson 1976) posits that individuals prefer to entertain relationships and display positive behaviors with people whose values and opinions are generally in agreement with their own and tend to reject or avoid those with whom they disagree. For example, negative ties within groups of peers elicit negative judgments, attitudes, and behavioral intentions (Labianca and Brass 2006). In this perspective, affective ties have been often studied as predictors of interpersonal citizenship behaviors (Labianca, Brass et al. 1998, Loi and Ngo 2009, Venkataramani, Labianca et al. 2013). Positive or negative affective relationships influence interpersonal citizenship with opposite effects (Venkataramani and Dalal 2007). Members of working groups receive help and harm from peers toward whom they engage in the same behaviors and from those in whom they elicit positive and negative affective states, respectively. Additionally, affective states towards colleagues predict the receipt of help and harm, suggesting a means by which social exchanges may become imbalanced (Lyons and Scott 2012). Negative personal relationships among members of the same team are detrimental

for performance (Duffy, Lee et al. 2012). Therefore, we hypothesize that positive affective ties increase ICB and negative affective ties decrease it.

Reciprocity

An important moderator of the relationship between affect and behavior is the symmetry (reciprocity) of the affective tie. Reciprocity refers to whether an individual is the object or source of like or dislike, or if the like or dislike is reciprocated (Wasserman and Faust 1994). Exchange theory states that people prefer balanced exchanges in their relationships (Ikkink and Van Tilburg 1999). Therefore, it is more likely that helping emerges and is confirmed by the counterparty in case of reciprocated positive affective ties. Differently, the least tendency to help and report a received help occurs when both parties dislike each other (Wasserman and Faust 1994), even though, in principle, the negative tie does not need to be reciprocated in order for it to be a liability. If the tie is not reciprocated, we must distinguish from X's ties not reciprocated by Y and the opposite case. With respect to positive affective ties, the increase in help from X to Y should persist also when the tie is only perceived by X, even if it could be less likely that Y confirms the help received (Bi-Fen, Wei-Li et al. 2011). If, instead, Y considers X as a friend but not vice-versa, X is not supposed to increase her base level of ICB. Turning to non-reciprocated negative ties, a decrease in ICB from X to Y is to be expected also when only X dislikes Y (Wasserman and Faust 1994). Also when the opposite occurs, i.e. Y dislikes X but not vice-versa, there could be a negative impact on ICB mostly due to Y's lower availability to confirm an helping behavior received from X. However, the latter effect should be smaller than the former, because in the second case X has no reason to avoid helping. For the above reasons this study hypothesizes that when positive or negative affective ties are reciprocated, their effects are amplified and when they are not reciprocated asymmetric effects are expected.

H1.a A positive affective tie from X to Y increases X's ICB towards Y

H1.b A reciprocated positive affective tie between X and Y increases X's ICB towards Y more than a non-reciprocated positive affective tie. However, a non-reciprocated

positive affective tie from X to Y has a less positive effect than a non-reciprocated tie from Y to X.

H2.a A negative tie from X to Y reduces X's ICB towards Y

H2.b A reciprocated negative affective tie between X and Y reduces X's ICB towards Y more than a non-reciprocated negative affective tie. However, a non-reciprocated negative affective tie from X to Y has a stronger negative effect than a non-reciprocated negative affective tie from Y to X.

Repeated collaboration

Helping each other is also influenced by experience of past team-work with the same person (Fleming, Mingo et al. 2007, Hahn, Moon et al. 2008). Repeated collaboration, associated to positive relationships increases trust and prosocial behaviors. Collaborating with persons towards which we have a positive feeling increases behavioral engagement and empathy (Emmerich and Masuch 2013). Collaboration and collaborative talks increase cohesion (Eder 1988), which is an antecedent of interpersonal citizenship such as helping others and sharing knowledge (Reagans and McEvily 2003, Ng and Van Dyne 2005). Repeated collaborators would know each other's work styles, strengths and weaknesses, experiences, and are able to avoid repeating unsuccessful collaborations (Fleming, Mingo et al. 2007). However, sometimes the unsuccessful collaboration, coupled with a negative tie, is not escapable in the future, that is X and Y are forced to work together in several projects. Some actions can be taken by organization and manager to reduce internal negative relationships and promote collaborative behaviors (Hardy and Phillips 1998). This study hypothesizes that, in the absence of explicit actions aimed at contrasting negative relationships and their effects, repeated collaboration will worsen the ICB outcome of a negative tie.

H3 Repeated collaboration moderates the effects of both positive and negative affective ties on ICB, such that their effects are stronger if X and Y have frequent collaborations.

Past friendship

The impact of relationship change on individuals and groups has more dramatic effects compared to an existing relationship (Rockett and Valenti 2013). However, the effect is not symmetric for positive and negative ties. Indeed, social penetration theory posits that developing a new friendship is a gradual process (Altman and Taylor 1973), because it starts from a superficial interaction in specific and limited exchange settings and proceeds towards an increasingly deeper and wider relationship. In contrast, negative relationships develop much faster and with more immediate and ultimate categorizations into "enemy", "rival" and other non-continuous classes (Wiseman and Duck 1995, Labianca and Brass 2006). Therefore, a new negative tie, emerging from a past friendship is immediately active with full potential, instead of showing positive memories of the past friendship tie. Moreover, due to the negative event asymmetry (Skowronski and Carlston, 1989; Labianca and Brass, 2006), the switch from a positive to a negative tie should carry more negative consequences than the maintenance of an existing negative tie.

H4 Past friendship moderates the relationship proposed in H2.a, such that the hypothesized reduction in ICB is stronger when the negative tie emerges from a past friendship.

<u>The impact of ICB on performance and advantage: the role of brokerage</u>

Interpersonal citizenship, consistent with other organizational citizenship behaviors, is generally considered beneficial for performance (e.g. MacKenzie, Podsakoff et al. 1991, Podsakoff, Ahearne et al. 1997, Podsakoff and MacKenzie 1997). Among the different dimensions of citizenship, helping others was found being the aspect of ICB most correlated with collective performance (Podsakoff and MacKenzie 1997). Organizational citizenship enhances coworkers' productivity (Organ 1988, MacKenzie, Podsakoff et al. 1991) and increases efficiency through a better allocation of time and a lower need of coordination (Borman and Motowidlo 1993). When a person helps a coworker, then, both

will benefit. Therefore, ICB and joint performance of X and Y should be positively correlated.

H5 ICB from X to Y increases the joint performance of the dyad XY

Helping others is a behavior associated to higher level of cohesive processes (Smith, Organ et al. 1983), and to an increasing levels of density in a team (Aoyagi, Cox et al. 2008). Moreover, a dense network can facilitate the returns of interpersonal citizenship (Chung, Park et al. 2011). In the previous hypotheses, we explored the beneficial effects of ICB on performance. However, since helping increases cohesion, it also reduces the benefits deriving from brokerage. Indeed, individuals spanning structural holes as brokers integrate different groups and benefit of grater variation and heterogeneity of information and develop ability in translating information from different groups (Burt 2004). Building on Burt's argument, the returns of brokerage are greater when the knowledge to be integrated is varied and different from the one to which the more dense portion of the network has access to. Consequently, if both X and Y are brokers, it is likely that helping will contribute less to the formation of social capital, unlike to what happens when people helping each other are embedded in the same dense network, where helping increases the aggregate benefits. The combined effect of helping and brokerage is that the joint positive returns of ICB are lowered (but still positive) when the level of brokerage is higher. As a consequence, this study hypothesizes that the positive effects on joint performance are higher when X and Y are embedded in the same network than when they are brokers.

H6 aggregate brokerage of X and Y moderates the relationship proposed as H5, such that the higher the aggregate brokerage, the lower the effect of ICB on joint performance

Taking the perspective of advantage, performing help can be interpreted as a loss of precious information (Bouty 2000), and as an increase in the redundancy of information within the person's connections (Fleming, Mingo et al. 2007). The loss of information is more detrimental for advantage when the individual performing help has more to lose. In the advantage perspective, then, if X is a broker who benefits from unique knowledge and decides to help Y who is not a broker, X is giving to Y part of her source of benefit,

potentially losing her competitive advantage. Moreover, if X owns valuable knowledge, avoiding help would protect her advantage but would decrease the aggregate outcome. Symmetrically, if X is not a broker and decides to help Y who is a broker, X gains the advantage of reinforcing a tie with a broker, acquiring an indirect benefit. Instead, this effect should be compensated when brokerage is more equally distributed. Therefore, brokers providing help to other individuals are more exposed to losing their advantage and non-brokers providing help to brokers will obtain an indirect benefit.

H7 ICB from X to Y reduces X's advantage on Y

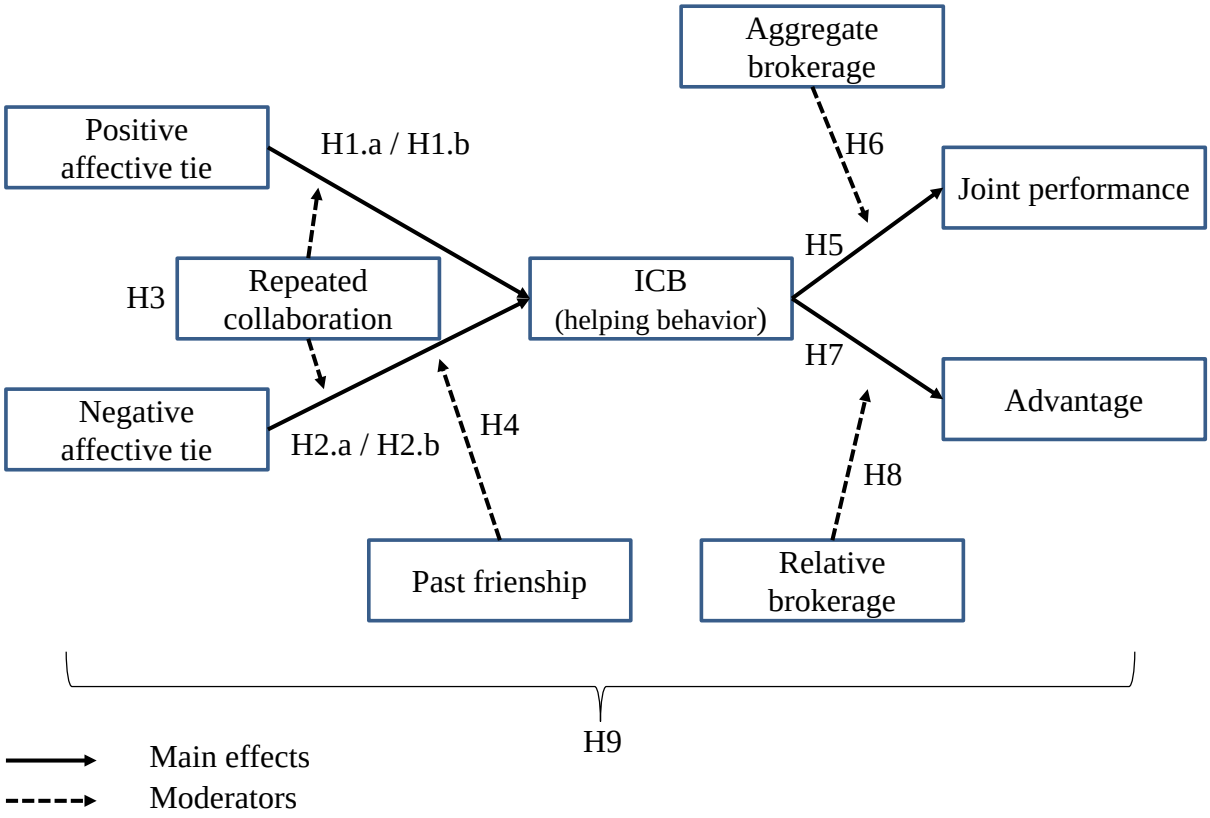
H8 Relative brokerage (X-Y) moderates the relationship proposed as H7, such that a higher brokerage of X compared to Y amplifies the negative effect of ICB on advantage

The impact of affective ties on performance and advantage mediated by ICB

The relationships proposed in the previous hypotheses raise the question about the final effect of positive and negative affective relationships on performance and advantage. When individual X feels a positive affective tie towards individual Y, she is more likely to help her, thus increasing the joint outcome but also potentially losing part of her advantage. Instead, a negative tie from X to Y reduces the likelihood of ICB, with a negative consequence on joint performance but with higher odds of protecting or increasing her advantage on Y. As last hypothesis, we propose a moderated mediation model, where ICB mediates the consequences of affective ties on performance and advantage, with the moderation of aggregate and relative brokerage, respectively. The full model is presented in the relational diagram (Figure 1).

H9 ICB mediates the effect of affective ties on both joint performance and advantage

Figure 1: relational diagram



3. Methods

Empirical setting

The proposed relationships were studied in the context of students of a postgraduate master program. 38 participants were surveyed about their social interactions, affective and instrumental ties, psychological traits and interpersonal citizenship. The survey was repeated three times in nine months. The first round of survey was launched one month after the kick-off, the second round was administered four months later, at the end of the common program and the final questionnaire was distributed at the end of the course period, nine months after the first round. The web-based questionnaire was built with Qualtrcs™ and every participant visualized a roster with the name of her/his colleagues. Between each round of social network survey, data about collaboration in teams were collected after every course whose syllabus included working groups. A total of 65 groups over 17 courses were identified. Group members were asked to perform an analysis of the

characteristics of the assigned task, a self-evaluation and a peer review on each groupmate. Results from working groups were aggregated at the time of the following round of social network analysis. Results of dyadic and directional interpersonal relationships and peer evaluations were then pooled in a comprehensive database. The unit of analysis was the (potential) relationship between individual X and individual Y. Due to possible cognitive biases, and since our hypotheses are mostly based on reciprocity and asymmetry, the relationship between X and Y is not necessarily symmetric and, therefore the unit of analysis should not be the dyad.

All students were noticed that the questionnaire was administered for research, they were informed that their name would have been included in rosters and displayed on their colleagues' computers, that participation was on a voluntary basis and all of them willing to complete the survey had to accept a privacy-related statement in which the details concerning the use of data were specified. Data were treated as confidential for the first round of social network survey and as anonymous in the two following rounds. To make this possible, an automatic macro algorithm was developed using Microsoft Office Excel™ to anonymize the retrieved questionnaires, so that after having coded each student's name, and deleted the original code, all the questionnaires were processed from the .cvs file using the macro. 38 out of 40 students accepted to participate (95%).

All questionnaires were in Italian. The original questions derived from the literature were translated into Italian and checked for spelling and content by an English native speaker, fluent in Italian.

Measures

Affective ties

The question about affective ties was administered using the roster of all students that had accepted to participate. For every person in the roster the respondent was asked to mark whether i) the focal person was considered to be a friend, ii) the focal person was considered to be an acquaintance, iii) the respondent did not know (or did not interact

with) the focal person, iv) the respondent did not interact with the focal person gladly or v) the respondent preferred to avoid the focal person (Labianca, Brass et al. 1998).

ICB

Interpersonal citizenship behaviors (ICB) is the set of behaviors, not explicitly required by organizations, that carry beneficial returns for recipients and the organization itself, reason why they are classified as a subset of organizational citizenship behaviors. Among the actions considered instances of ICB, the present study focuses on helping behaviors. In particular, helping others was surveyed both through the social network questionnaires and through the peer-evaluation ones, by posing three questions on a Likert scale 1-7 (Morrison and Phelps 1999), always using the roster method: i) “I helped this person in case of absence or difficulty”; ii) “I helped this person when he/she was overloaded” and iii) “I helped this person even if not required”. The opposite questions were posed in the passive form (e.g. “I received help from this person in case of absence and difficulty”) to reduce the impact of cognitive biases on the actual performance of ICB. The three questions were internally consistent and aligned on a reliable scale (alpha=0.89 for questions posed in the active form and alpha=0.99 for question posed in the passive form). Consequently, the average scores across the two sets of three question were calculated and compared. A directional tie was established only if both the performer and the receiver of ICB confirmed the action by answering in the same region of the scale (both greater of lower than 3, and 0 otherwise). The final value in case of agreement was averaged between the performer and the receiver.

Joint performance

Individual performance coincided with the final score of every course (0-30 scale), who partially depended on the team-work assignment (generally between 10% and 40%). The values were summed at each of the three points in time of the social network survey. Joint performance was calculated as the average between the two values of individual performance and was equally aggregated over time, accordingly.

Advantage

Among the several dimensions of advantage (Burt, Kilduff et al. 2013), the present study uses the difference in individual performance between individual X and individual Y. This choice is motivated by the interest in studying the simultaneous effects of affective ties and ICB on consistent definitions of performance and advantage. If both performance and advantage move in the same direction, the organization will benefit either from a paretian improvement or from an asymmetric effect, where the reduction in Y's performance is overcompensated by the increase in X's one. Instead, if the two variables showed diverging dynamics, a trade-off would exists between increasing the joint performance of X and Y and X gaining advantage over Y.

Brokerage

Brokerage was calculated in the positive affective tie network. Among the different measures of brokerage, this study uses the composite index proposed by Gould and Fernandez (1989) and was calculated using UCINET™ software. Aggregate brokerage was calculated as the average of the composite index of X and Y (Gould and Fernandez 1989). Relative brokerage was defined as the difference between the brokerage indexes of X and Y.

Control variables

The analysis includes several control variables, suggested by the literature as factors potentially influencing either the impact of affective ties on ICB or the effect of ICB on performance, or both.

- Centrality: degree centrality in positive affective network was included to correctly disentangle the impact of brokerage. Centrality implies the ability to access and be accessed by a greater number of members through positive relationships (Venkataramani and Dalal 2007). A number of studies (e.g. Burke, Weir et al. 1976) have shown that central individuals are more likely to be asked for assistance, because network problems (e.g. unsatisfactory coordination, conflicts between group members, etc.) can be resolved more easily with the help of these

well-liked or popular members. Therefore, since more central individuals are more sensitive to opportunities for interpersonal helping (Farh, Podsakoff et al. 1990) and since centrality can also affect job performance (Sparrowe, Liden et al. 2001), it was included in the analysis as the difference (X-Y).

- Self-reported general attitude towards ICB (Morrison and Phelps 1999). This variable was included to control for possible self-representation bias in X's performance of ICB (Latham and Cummings 2000).
- Personality traits. Personality traits are known to influence both behaviors (e.g. Fiedler 1972, Antonioni 1998, Bi-Fen, Wei-Li et al. 2011) and performance (e.g. Bolin and Neuman 2006, Arnold and Clark 2016). To control for their potentially confounding effects, the "Big Five" personality traits were computed at every round of social network survey using the ten-questions format (Gosling, Rentfrow et al. 2003). The check of reliability was successful. Extraversion, agreeableness, conscientiousness, emotional stability and openness to experience were included both as absolute values for person X and as the X-Y difference.
- Previous performance and its X-Y difference was added as a proxy for the expectation of a dissimilarity in current performance, an influence factor that could prevent individuals from displaying helping behaviors (Lam, Van der Vegt et al. 2011). Prior literature has also shown that past performance is a predictor of current performance (Glew 2009). Previous performance was measured as the final graduation mark obtained in the last graduate or post-graduate program completed before starting the master.
- Demographic dissimilarity (gender, geographical area of birth and university background) was added as factor influencing ICB and performance (e.g. Chattopadhyay 1999, Hobman, Bordia et al. 2004, Van der Vegt and Van De Vliert 2005, Tröster and van Knippenberg 2012).

Analysis

The unit of analysis was the directional potential relationship between individual X and individual Y. The total number of observations, therefore, was equal to the squared number of participants (n= 38^2 = 1,444). The dataset was structured as a longitudinal

panel. Panel data regression analysis with random effects (to address the cross-sectional variability and capture the impact of some important control variables) was performed to test for H1 – H8 and H9 was tested using the Sobel-Goodman test (bootstrap procedure with 500 replications). As robustness checks, all models were tested with fixed effects, and an alternative measure of ICB was used (the reported intention of individual X to share knowledge with individual Y).

4. Results

Descriptive statistics

The descriptive statistics of the sample, affective ties, other variables and correlations are summarized in Table 1 – Table 4.

Table 1: sample characteristics

Sample characteristics	N	%
N° of participants	38	100%
Gender = Female	19	50%
University background		
Management	8	21.1%
Pharmacy	8	21.1%
Biology	6	15.8%
Law	4	10.5%
Biomedical engeneering	3	7.9%
Biotechnologies	3	7.9%
International relations	2	5.3%
Philosophy	2	5.3%
Engineering	1	2.6%
Psychology	1	2.6%
Geographical area		
South	21	55.3%
North	14	36.8%
Center	3	7.9%

Table 2: affective ties (number of directional ties)

	Time		
Variable	**1**	**2**	**3**
Number of directional dyads	1,444	1,444	1,444
PAT X→Y	969	1,033	1,058
Reciprocal PAT	153	215	234
NAT X→Y	42	56	143
Reciprocal NAT	2	4	52
New negative ties emerging by past friendship	-	12	16

PAT= positive affective ties; NAT= negative affective ties

Table 3: other measures

			T=1		
Variable	**N**	**mean**	**sd**	**max**	**min**
ICB	1394	1.46	2.46	7.00	-
Degree centrality	1444	8.21	8.75	37.00	-
Brokerage	1444	36.50	71.98	383.00	-
Repeated collaboration	1444	0.48	0.69	3.00	-
Extraversion	1444	1.71	2.77	6.00	- 5.00
Agreeableness	1444	3.45	2.00	6.00	- 2.00
Conscientiousness	1444	4.79	1.47	6.00	- 1.00
Emotional stability	1444	- 0.45	1.97	4.00	- 6.00
Opennes	1444	3.71	1.76	6.00	- 3.00
Previous performance	1444	103.63	7.69	111.00	78.00
Self-reported OCB	1444	6.03	1.11	7.00	2.00
Variable			**T=2**		
ICB	1369	1.81	2.68	7.00	-
Degree centrality	1444	9.34	8.48	31.00	-
Brokerage	1444	36.50	71.98	383.00	-
Repeated collaboration	1444	1.59	1.68	11.00	-
Extraversion	1406	1.73	2.53	6.00	- 4.00
Agreeableness	1406	3.76	1.95	6.00	- 1.00
Conscientiousness	1406	5.08	1.50	6.00	-
Emotional stability	1406	2.81	2.46	6.00	- 3.00
Opennes	1406	3.97	2.03	6.00	- 1.00
Previous performance	1444	103.63	7.69	111.00	78.00
Self-reported OCB	1406	6.65	0.53	7.00	5.00
Variable			**T=3**		
ICB	1258	2.09	2.79	7.00	-
Degree centrality	1444	9.68	8.22	37.00	-
Brokerage	1444	48.08	72.72	340.00	-
Repeated collaboration	1444	1.83	2.05	14.00	-
Extraversion	1292	1.85	2.57	6.00	- 3.00
Agreeableness	1292	3.53	1.93	6.00	-
Conscientiousness	1292	5.09	1.36	6.00	-
Emotional stability	1292	2.94	2.39	6.00	- 2.00
Opennes	1292	4.00	1.88	6.00	-
Previous performance	1444	103.63	7.69	111.00	78.00
Self-reported OCB	1292	6.26	0.82	7.00	4.00

Table 4: correlation matrix

n	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	PAT												
(2)	NAT	-0.13*											
(3)	ICB	0.41*	-0.15*										
(4)	Degree centrality	0.52*	-0.01	0.15*									
(5)	Brokerage	0.43*	-0.02	0.14*	0.82*								
(6)	Repeated collaboration	0.04*	-0.04	0.20*	0.03	0.02							
(7)	Extraversion	0.19*	-0.05*	0.08*	0.36*	0.31*	-0.01						
(8)	Agreeableness	0.06*	-0.04*	-0.06*	0.12*	0.09*	0.02	0.10*					
(9)	Conscientiousness	-0.01	0.04*	-0.05*	-0.02	-0.09*	0.04*	0.22*	0.49*				
(10)	Emotional stability	0.03	0.07*	-0.04*	0.06*	0.07*	0.20*	-0.07*	0.12*	0.21*			
(11)	Opennes	0.12*	-0.03*	0.05*	0.23*	0.11*	0.02	0.50*	0.28*	0.46*	0.14*		
(12)	Previous performance	-0.07*	-0.01	0.06*	-0.14*	-0.09*	0.02	-0.33*	0.16*	0.05*	-0.11*	-0.16*	
(13)	Self-reported OCB	0.03*	-0.06*	0.07*	0.06*	0.09*	0.08*	0.37*	0.35*	0.25*	0.19*	0.39*	0.01

* $p<0.05$

Test of hypotheses

The results of the regression analysis is reported in Table 5 (hypotheses 1, 2, 3 and 4), Table 6 (hypotheses 5, 6, 7 and 8) and Table 7 (hypothesis 9).

Impact of affective ties on ICB

Hypothesis 1.a proposed that a positive affective tie (PAT) from X to Y should increase X's level of ICB towards Y. Consistently, the coefficient for "PAT X→Y" in model 1 is positive and significant. Hypothesis 1.b deepened the content of hypothesis 1.a including the effect of reciprocity. In model 2, the coefficient for "reciprocal PAT" is positive, significant and larger in magnitude compared to "PAT X→Y only" and to "PAT Y→X only", supporting hypothesis 1.b. Interestingly, while the former is lower in magnitude but still positive and significant, the latter is negative and significant, showing that, in the absence of a feeling of friendship, ICB is decreased. This result, however, could be different across cultures. Hypothesis 2.a regarded the effect of a negative tie (NAT) on ICB. The coefficient for "NAT X→Y" reported in model 3 is negative and significant, consistent with the hypothesis. Supporting hypothesis 2.b, the coefficient for "Reciprocal NAT) in model 4 was negative and larger in magnitude compared to the one of "NAT X→Y only". The latter was still negative and significant and there was no effect of the non-reciprocated NAT from Y to X. The last result is consistent with social exchange theory because X adopts or avoids ICB according to her perceived social relationships and consequent effects, so that if a negative tie is not perceived (which could imply both a void relationship or a positive tie) there is no pressure towards avoidance of ICB. Repeated collaboration is generally positive, other things being equal. Therefore, more mutual experience carries more reciprocal understanding and willingness to help. However, when coupled with a positive tie, its effect is stronger (model 5) and when interacted with a negative tie, it reinforced the negative effect (model 6), consistent with hypothesis 3. Hypothesis 4 predicted that a negative tie emerging from a past friendship inhibited ICB to a larger extent, compared to an existing negative tie. This prediction was supported by the negative sign of the coefficient of "NAT x past friendship" reported in model 7.

Table 5: effects of affective ties on ICB (H1-H4)

VARIABLES	(1) ICB	(2) ICB	(3) ICB	(4) ICB	(5) ICB	(6) ICB	(7) ICB
PAT X→Y	2.27***				1.96***		
Reciprocal PAT		3.81***					
PAT X→Y only		2.41***					
PAT Y→X only		-1.76***					
NAT X→Y			-1.38***			-0.53***	-1.24***
Reciprocal NAT				-1.44***			
NAT Y→X only				-0.10			
NAT X→Y only				-1.02***			
Repeated collaboration	0.31***	0.27***	0.45***	0.45***	0.03	0.49***	0.45***
PAT x Repeated collaboration					0.89***		
NAT x Repeated collaboration						-0.71***	
NAT x past PAT							-1.44***
Difference in network centrality	0.04***	0.03***	0.02***	0.02***	0.03***	0.02***	0.02***
X's extraversion	0.03*	0.02	0.06***	0.07***	0.04**	0.06***	0.07***
X's agreeableness	-0.14***	-0.14***	-0.10***	-0.09***	-0.11***	-0.10***	-0.09***
X's conscientiousness	-0.11***	-0.10***	-0.14***	-0.16***	-0.15***	-0.15***	-0.16***
X's emotional stability	-0.10***	-0.10***	-0.11***	-0.11***	-0.10***	-0.11***	-0.11***
X's opennes	0.03	0.03	0.06**	0.06**	0.04	0.06**	0.06**
Extraversion (X-Y)	-0.01	-0.01	0.01	0.01	-0.00	0.01	0.00
Agreeableness (X-Y)	0.03	0.03	0.02	0.02	0.02	0.02	0.02
Conscientiousness (X-Y)	-0.08***	-0.06**	-0.07**	-0.07**	-0.08***	-0.08**	-0.08**
Emotional stability (X-Y)	-0.01	-0.01	-0.03	-0.02	-0.01	-0.03	-0.02
Opennes (X-Y)	-0.04*	-0.04*	-0.05**	-0.05**	-0.05**	-0.05**	-0.05**
Same gender	-0.02	-0.06	0.05	0.03	-0.00	0.04	0.04
X's previous performance	0.03***	0.03***	0.01**	0.02**	0.03***	0.01**	0.02**

Previous performance (X-Y)	-0.03***	-0.03***	-0.04***	-0.04***	-0.02***	-0.04***	-0.04***
Same geo area	0.06	0.08	0.06	0.06	0.07	0.06	0.06
Same university background	0.22*	0.28**	0.15	0.15	0.27*	0.13	0.14
X's self-reported general ICB	0.22***	0.22***	0.14***	0.15***	0.23***	0.14***	0.15***
Time	0.23***	0.26***	0.31***	0.29***	0.25***	0.30***	0.29***
Constant	-2.36***	-2.79***	-0.29	-0.35	-1.86***	-0.26	-0.34
Observations	3,848	3,848	3,848	3,848	3,848	3,848	3,848
Number of dyads	1,408	1,408	1,408	1,408	1,408	1,408	1,408
R-squared between	0.348	0.361	0.148	0.130	0.310	0.147	0.128

*** p<0.01, ** p<0.05, * p<0.1

PAT= positive affective tie; NAT=negative affective tie; ICB=interpersonal citizenship behavior (helping); (X-Y) indicates the difference between the variable calculated for individual X and the same variable calculated for individual Y.

Impact of ICB on performance and advantage

The second set of hypotheses regarded the impact of ICB on joint performance of X and Y and on X's advantage over Y. Hypothesis 5 proposed that ICB from X to Y increases the joint performance of X and Y and was supported (model 8). The impact of the interaction between aggregate brokerage and ICB (model 9) was negative and significant, supporting hypothesis 6. The returns of helping behaviors are lower when brokerage is higher. Hypothesis 7 proposed a negative relationship between ICB and advantage, but the coefficient reported in model 10 was not significant. However, this lack of significance did not correspond to a null effect because, supporting hypothesis 8, the coefficient of the interaction between ICB and delta brokerage was negative and significant (model 11). Combining the evidence of model 10 and model 11, it should be concluded that the impact of ICB from X to Yon X's advantage is positive when X is more embedded in a cohesive network compared to Y (negative delta brokerage) and negative when X's brokerage is higher than Y's one.

Table 6: effects of ICB on joint performance and advantage (H5-H8)

VARIABLES	(8) Joint performance	(9) Joint performance	(10) Advantage	(11) Advantage
ICB X→Y	0.01**	0.03***	0.01	0.01
ICB x Aggregate brokerage		-0.01***		
ICB x Delta brokerage (X-Y)				-0.02***
Same gender	-0.01	-0.01		0.04
X's previous performance	0.04***	0.04***	0.11***	0.11***
Previous performance (X-Y)	-0.01***	-0.01***	0.04***	0.04***
Same geo area	-0.12***	-0.12***	0.09	0.09
Same university background	-0.08	-0.08	0.00	0.01
Repeated collaboration	0.03*	0.03*	0.01	0.02
X's self-reported general ICB	0.09***	0.09***	0.04	0.04
Time	0.06***	0.06***	-0.05	-0.05
Constant	21.83***	21.87***	-12.54***	-12.50***
Observations	4,021	4,021	4,021	4,021
Number of dyads	1,408	1,408	1,408	1,408
R-squared between	0.193	0.198	0.193	0.196

*** p<0.01, ** p<0.05, * p<0.1

Mediation hypothesis

Hypothesis 9 proposed that affective ties influence performance and advantage with the mediation of ICB. The results of the mediation tests are reported in Table 7. The test on joint performance supported partial mediation. Both positive and negative affective tie had direct effect on joint performance. In particular, confirming the results of the previous literature, positive ties are beneficial for joint performance and negative ties have the opposite effect. The direct effect was stronger than the indirect one. The impact of brokerage, analyzed more in depth in the discussion section, smoothens the differences but does not qualitatively alter the positive and negative consequences of affective ties on performance. Full mediation was supported, instead, in the case of advantage. In both the model on positive affective ties and in the one on negative affective ties the direct and the total effects were not significant and the impact of relationships on advantage is only transferred through the mechanism of ICB. This evidence explains the lack of support for hypothesis 7: the level of ICB is endogenous to affective ties and so is its impact on advantage. Positive affective ties decrease X's advantage over Y because of the leak of precious knowledge through ICB. Instead, negative affective ties "protect" X's competitive advantage preventing an outgoing flow of knowledge that could erode it. However, the moderation of brokerage is determinant: when X's brokerage is higher than Y's one, a negative tie actually protects X's advantage, but when the opposite occurs, X increases her advantage having a positive affective tie with Y when the latter is a broker.

Table 7: summary of mediation tests

	Dependent variable			
	Joint performance	**Joint performance**	**Advantage**	**Advantage**
Mediator	ICB (X→Y)	ICB (X→Y)	ICB (X→Y)	ICB (X→Y)
Independent variable	Positive affective tie (X→Y)	Negative affective tie (X→Y)	Positive affective tie (X→Y)	Negative affective tie (X→Y)
Moderator(s)	Aggregate brokerage	Aggregate brokerage	Delta brokerage	Delta brokerage
Sobel-Goodman test (bootstrap)	***	***	***	***
Indirect effect	0.03***	-0.03***	-0.36***	0.07***
Direct effect	0.22***	-0.49**	0.05	-0.07
Total effect	0.24***	-0.52**	0.16	-0.01
ICB x moderator	-0.001***	-0.001***	-0.003***	-0.003***
Full / Part. mediation	Partial	Partial	Full	Full
% effect mediated	54%	6%	100%	100%

*** p<0.01, ** p<0.05, * p<0.1

Robustness checks

Most of the robustness checks provided results consistent with the main models. In the case of fixed-effects models they were less able to explain the variability of the dependent variables, but the hypotheses were generally supported, with the exception of H2.b, H5 and H7. The Hausman test suggested that random effects models were superior. With respect to the alternative measure of ICB, knowledge-sharing intention, it supported all the hypotheses, including mediation, but with stronger effects. The reason is that a double filter applies from intentions to actual behaviors. The first filter acts from the intention to the decision to activate the behavior, and the second filter separates behaviors that we think to have performed from the behaviors that others recognize as really activated.

Limitations

This research carries some limitations. First, data were collected from students, with evident limited generalizability. However, many studies have used the same empirical setting (e.g. Shrader and Lewit 1962, Morrison, Greene et al. 1979, Antonioni 1998, Bolin and Neuman 2006, Wei-Ching, Chung-Chi et al. 2012). Moreover, in the present case we

observed the real-world dynamics emerging from working groups, which are more likely to spontaneously (if not precisely) reproduce organizational settings than are lab experiments. Second, the measure of ICB used in the analysis captures mostly the helping dimension of ICB (even though the one impacting the most). To partly correct this potential bias, the robustness check have included the intention of knowledge-sharing, which is it is not, however, an actual behavior.

5. Discussion and managerial implications

This study provided intriguing results and opens new questions for both scholars and practitioners. In this section, four implications of our results will be discussed, mostly related to the trade-off between joint and differential performance.

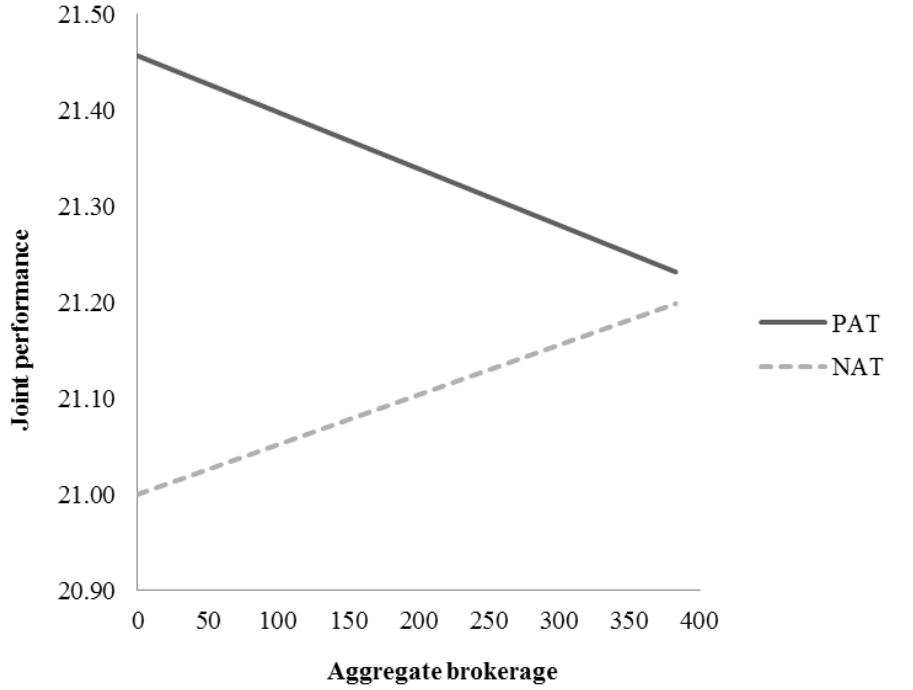
1) Positive affective ties increase social capital and negative affective ties destroy it;
2) Friends are not always a source of advantage;
3) Helping brokers increases advantage;
4) Negative affective ties contribute to brokers' advantage.

Positive affective ties increase social capital and negative affective ties destroy it

The impact of affective ties on ICB reveals that desirable social processes and citizenship behaviors are more likely to develop on the basis of positive feelings and emotions, carrying this effect to collective outcomes. However, beyond the mediation, a direct effect on performance is evident. A reasonable interpretation is that behaviors are just one out of multiple transmission mechanisms on performance. In other words, affective ties create the premises for collective outcomes. The good news for managers is that promoting social relationships and thus increasing the likelihood of positive affective ties is beneficial for general performance. Accordingly, preventing and explicitly treating the emergence of negative relationships shows positive returns, even if these results could be attenuated when the level of brokerage is high (Figure 2). Interestingly, when brokerage is high, the adverse effects of negative ties are reduced. However, people are not only concerned by collective outcomes. Self-interest could drive individuals to also evaluate

the effects of affective ties in the workplace in connection with their own performance, particularly if the level of competition is high.

Figure 2: the mediated effect of positive and negative affective ties on joint performance at different levels of aggregate brokerage



Friends are not always a source of advantage

Helping a friend is an expected and often spontaneous action. Prior research has also proved that performance of ICB has a positive rebound effect on the person who activates it. However, in the workplace, competition exists also among friends. In the context of a grounded theoretical framework for exchange decisions among scientists, Bouty (2000) argued that sharing precious knowledge, with peers working for other organizations requires relationships based on high levels acquaintance and mutual trust (Bouty 2000). As a consequence, there are both benefits and costs in activating citizenship behaviors. Our results show that the balance between benefits and costs depends on the relative structural positions of both performers and receivers of help (Figure 3 and 4). The same action could carry opposite rebound effects if the helping person is a broker or not. In some cases, namely when the person occupies strategic positions on structural holes, she

will be debated between helping others, increasing the aggregate performance, or avoiding help to maintain her competitive advantage. This result should be read in the light that, in many circumstances, brokerage tends to be higher when the person occupies a leadership position (Burt, 2004), where she is able to interact with peer-leaders of other departments, obtaining efficient access to diverse knowledge. Bowler and Brass (2006) reported that peers are more likely to engage in interpersonal citizenship behaviors than individuals occupying different positions in the hierarchy. The consequence is that "helping others" is more costly for leaders than it is for non-leaders, even if help from leaders could be extremely valuable for the collective outcome. Moreover, when brokerage and leadership are correlated, the broker could be motivated to maintain a performance gap with the subordinate person, and avoiding help could contribute to this end.

Helping brokers increases advantage

The opposite is true for people embedded in cohesive networks that activate ICB with a broker. Helping a broker carries positive returns. If the broker is a peer, helping her will reinforce a positive tie or create a new one. Moreover, linking to a broker is indirectly a means to rip the first-hand benefits of new ideas, fresh knowledge, etc. If the broker is a leader, instead, the advantage is related to the creation or reinforcement of the connection with a person endowed with position power. The benefits of being in the "attention area" of the leader can be translated into better evaluations, higher probability of promotion, increased job satisfaction, etc.

Negative affective ties contribute to brokers' advantage

Relationships on the workplace can be a strategic option for individuals in the perspective of career-building (Gersick, Dutton et al. 2000). Another insight from our results is that negative ties have a role in maintaining advantage. Brokers could obtain returns from negative relationships with non-brokers, because the cost of the missing ICB is strongly biased towards the latter. Negative ties protect brokers from the loss of competitive advantage. A disquieting consequence, consistent with social exchange theory, is that brokers could indeed form and maintain negative relationships on purpose, or accept that they are a "necessary evil" to advance in their career or to protect their current position.

The contribution of the present study is to show that the reasons behind such behaviors are not simply related to “bad”, “unscrupulous” persons, but instead it deals with a rational behavior, that is likely to emerge when the value of collective outcomes is not sufficiently (or convincingly) stressed by organizational culture or by the example of “behavioral models”. Further research should deepen the conditions in which the trade-off between self-interest and collective interested is solved making the former prevail.

Figure 3: the mediated effect of positive and negative affective ties on X's advantage at different levels of brokerage imbalance (X-Y)

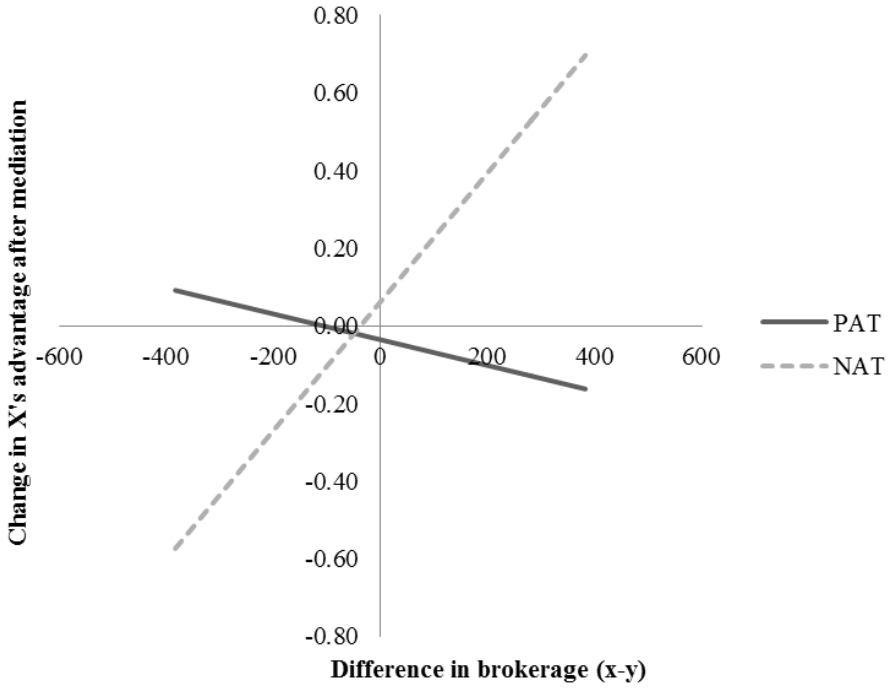
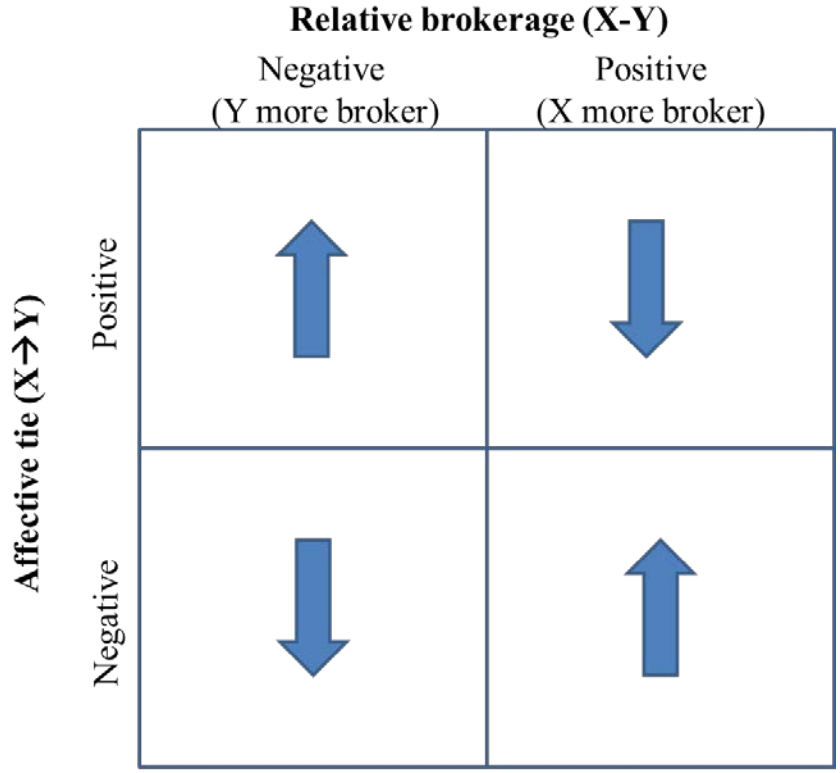


Figure 4: the impact of affective ties and relative brokerage on X's advantage



Note: the arrows indicate the increase or decrease in X's advantage over Y

References

Altman, I. And D. A. Taylor (1973). Social Penetration: The Development Of Interpersonal Relationships, Holt, Rinehart & Winston.

Antonioni, D. (1998). "Relationship Between The Big Five Personality Factors And Conflict Management Styles." International Journal Of Conflict Management **9**(4): 336-355.

Aoyagi, M. W., R. H. Cox And R. T. Mcguire (2008). "Organizational Citizenship Behavior In Sport: Relationships With Leadership, Team Cohesion, And Athlete Satisfaction." Journal Of Applied Sport Psychology **20**(1): 25-41.

Arnold, J. And M. Clark (2016). "Running The Penultimate Lap Of The Race: A Multimethod Analysis Of Growth, Generativity, Career Orientation, And Personality

Amongst Men In Mid/Late Career." Journal Of Occupational & Organizational Psychology **89**(2): 308-329.

Bi-Fen, H., W. Wei-Li And Y. Ryh-Song (2011). "Team Personality Composition, Affective Ties And Knowledge Sharing: A Team-Level Analysis." International Journal Of Technology Management **53**(2-4): 331-351.

Bolin, A. U. And G. A. Neuman (2006). "Personality, Process, And Performance In Interactwe Brainstorming Groups." Journal Of Business & Psychology **20**(4): 565-585.

Borman, W. C. And S. Motowidlo (1993). "Expanding The Criterion Domain To Include Elements Of Contextual Performance." Personnel Selection In Organizations; San Francisco: Jossey-Bass: 71.

Bouty, I. (2000). "Interpersonal And Interaction Influences On Informal Resource Exchanges Between R&D Researchers Across Organizational Boundaries." Academy Of Management Journal **43**(1): 50-65.

Bowler, W. M. And D. J. Brass (2006). "Relational Correlates Of Interpersonal Citizenship Behavior: A Social Network Perspective." Journal Of Applied Psychology **91**(1): 70-82.

Burke, R. J., T. Weir And G. Duncan (1976). "Informal Helping Relationship In Work Organizations." Academy Of Management Journal **19**(3): 370-377.

Burt, R. S. (2004). "Structural Holes And Good Ideas." American Journal Of Sociology **110**(2): 349-399.

Burt, R. S., M. Kilduff And S. Tasselli (2013). "Social Network Analysis: Foundations And Frontiers On Advantage." Annual Review Of Psychology **64**: 527-547.

Chattopadhyay, P. (1999). "Beyond Direct And Symmetrical Effects: The Influence Of Demographic Dissimilarity On Organizational Citizenship Behavior." Academy Of Management Journal **42**(3): 273-287.

Chung, M.-H., J. Park, H. K. Moon And H. Oh (2011). "The Multilevel Effects Of Network Embeddedness On Interpersonal Citizenship Behavior." Small Group Research **42**(6): 730-760.

Duffy, M. K., K. Lee, Eby, T. And Allen (2012). "Negative Interpersonal Exchanges In Teams." Siop Organizational Frontiers Series. Personal Relationships: The Effect On Employee Attitudes, Behavior, And Well-Being: 195-219.

Eder, D. (1988). "Building Cohesion Through Collaborative Narration." Social Psychology Quarterly: 225-235.

Emerson, R. M. (1976). "Social Exchange Theory." Annual Review Of Sociology: 335-362.

Emmerich, K. And M. Masuch (2013). Helping Friends Or Fighting Foes: The Influence Of Collaboration And Competition On Player Experience. Fdg.

Farh, J.-L., P. M. Podsakoff And D. W. Organ (1990). "Accounting For Organizational Citizenship Behavior: Leader Fairness And Task Scope Versus Satisfaction." Journal Of Management **16**(4): 705-721.

Fiedler, F. E. (1972). "Personality, Motivational Systems, And Behavior Of High And Low Lpc Persons." Human Relations **25**(5): 391-412.

Fleming, L., S. Mingo And D. Chen (2007). "Brokerage Vs. Cohesion And Collaborative Creativity: An Evolutionary Revolution." Admin. Sci. Quart **52**: 443-475.

Gersick, C. J. G., J. E. Dutton And J. M. Bartunek (2000). "Learning From Academia: The Importance Of Relationships In Professional Life." Academy Of Management Journal **43**(6): 1026-1044.

Glew, D. J. (2009). "Personal Values And Performance In Teams: An Individual And Team-Level Analysis." Small Group Research **40**(6): 670-693.

Gosling, S. D., P. J. Rentfrow And W. B. Swann (2003). "A Very Brief Measure Of The Big-Five Personality Domains." Journal Of Research In Personality **37**(6): 504-528.

Gould, R. V. And R. M. Fernandez (1989). "Structures Of Mediation: A Formal Approach To Brokerage In Transaction Networks." Sociological Methodology **19**(1989): 89-126.

Hahn, J., J. Y. Moon And C. Zhang (2008). "Emergence Of New Project Teams From Open Source Software Developer Networks: Impact Of Prior Collaboration Ties." Information Systems Research **19**(3): 369-391.

Hardy, C. And N. Phillips (1998). "Strategies Of Engagement: Lessons From The Critical Examination Of Collaboration And Conflict In An Interorganizational Domain." Organization Science **9**(2): 217-230.

Hobman, E. V., P. Bordia And C. Gallois (2004). "Perceived Dissimilarity And Work Group Involvement The Moderating Effects Of Group Openness To Diversity." Group & Organization Management **29**(5): 560-587.

Homans, G. C. (1958). "Social Behavior As Exchange." American Journal Of Sociology: 597-606.

Ikkink, K. K. And T. Van Tilburg (1999). "Broken Ties: Reciprocity And Other Factors Affecting The Termination Of Older Adults' Relationships." Social Networks **21**(2): 131-146.

Kiefer, T. (2005). "Feeling Bad: Antecedents And Consequences Of Negative Emotions In Ongoing Change." Journal Of Organizational Behavior **26**(8): 875-897.

Labianca, G. And D. J. Brass (2006). "Exploring The Social Ledger: Negative Relationships And Negative Asymmetry In Social Networks In Organizations." Academy Of Management Review **31**(3): 596-614.

Labianca, G., D. J. Brass And B. Gray (1998). "Social Networks And Perceptions Of Intergroup Conflict: The Role Of Negative Relationships And Third Parties." Academy Of Management Journal **41**(1): 55-67.

Lam, C. K., G. S. Van Der Vegt, F. Walter And X. Huang (2011). "Harming High Performers: A Social Comparison Perspective On Interpersonal Harming In Work Teams." Journal Of Applied Psychology **96**(3): 588.

Latham, M. E. And L. Cummings (2000). "Collectivism, Propensity To Trust And Self-Esteem As Predictors Of Organizational Citizenship In A Non-Work Setting."

Li, F., F. Zhou And K. Leung (2011). "Expecting The Worst: Moderating Effects Of Social Cynicism On The Relationships Between Relationship Conflict And Negative Affective Reactions." Journal Of Business & Psychology **26**(3): 339-345.

Loi, R. And H.-Y. Ngo (2009). "Work Outcomes Of Relational Demography In Chinese Vertical Dyads." International Journal Of Human Resource Management **20**(8): 1704-1719.

Lyons, B. J. And B. A. Scott (2012). "Integrating Social Exchange And Affective Explanations For The Receipt Of Help And Harm: A Social Network Approach." Organizational Behavior & Human Decision Processes **117**(1): 66-79.

Mackenzie, S. B., P. M. Podsakoff And R. Fetter (1991). "Organizational Citizenship Behavior And Objective Productivity As Determinants Of Managerial Evaluations Of Salespersons' Performance." Organizational Behavior And Human Decision Processes **50**(1): 123-150.

Morrison, E. W. And C. C. Phelps (1999). "Taking Charge At Work: Extrarole Efforts To Initiate Workplace Change." Academy Of Management Journal **42**(4): 403-419.

Morrison, T. L., L. R. Greene And N. G. Tischler (1979). "Member Learning In Analytic Self-Study Groups." Journal Of Social Psychology **109**(1): 59.

Ng, K. Y. And L. Van Dyne (2005). "Antecedents And Performance Consequences Of Helping Behavior In Work Groups A Multilevel Analysis." Group & Organization Management **30**(5): 514-540.

Organ, D. W. (1988). Organizational Citizenship Behavior: The Good Soldier Syndrome, Lexington Books/Dc Heath And Com.

Podsakoff, P. M., M. Ahearne And S. B. Mackenzie (1997). "Organizational Citizenship Behavior And The Quantity And Quality Of Work Group Performance." Journal Of Applied Psychology **82**(2): 262.

Podsakoff, P. M. And S. B. Mackenzie (1997). "Impact Of Organizational Citizenship Behavior On Organizational Performance: A Review And Suggestion For Future Research." Human Performance **10**(2): 133-151.

Reagans, R. And B. Mcevily (2003). "Network Structure And Knowledge Transfer: The Effects Of Cohesion And Range." Administrative Science Quarterly **48**(2): 240-267.

Rockett, T. And M. A. Valenti (2013). "When A Friend Becomes A Foe: The Effects Of Relational Rifts On Individuals And Groups." Journal Of Management Policy & Practice **14**(5): 57-69.

Shrader, E. G. And D. W. Lewit (1962). "Structural Factors In Cognitive Balancing Behavior." Human Relations **15**(3): 265-275.

Smith, C., D. W. Organ And J. P. Near (1983). "Organizational Citizenship Behavior: Its Nature And Antecedents." Journal Of Applied Psychology **68**(4): 653.

Sparrowe, R. T., R. C. Liden, S. J. Wayne And M. L. Kraimer (2001). "Social Networks And The Performance Of Individuals And Groups." Academy Of Management Journal **44**(2): 316-325.

Tröster, C. And D. Van Knippenberg (2012). "Leader Openness, Nationality Dissimilarity, And Voice In Multinational Management Teams." Journal Of International Business Studies **43**(6): 591-613.

Van Der Vegt, G. S. And E. Van De Vliert (2005). "Effects Of Perceived Skill Dissimilarity And Task Interdependence On Helping In Work Teams." Journal Of Management **31**(1): 73-89.

Venkataramani, V. And R. S. Dalal (2007). "Who Helps And Harms Whom? Relational Antecedents Of Interpersonal Helping And Harming In Organizations." Journal Of Applied Psychology **92**(4): 952-966.

Venkataramani, V., G. Labianca And T. Grosser (2013). "Positive And Negative Workplace Relationships, Social Satisfaction, And Organizational Attachment." Journal Of Applied Psychology **98**(6): 1028-1039.

Wasserman, S. And K. Faust (1994). Social Network Analysis: Methods And Applications, Cambridge University Press.

Wei-Ching, W., W. U. Chung-Chi, W. U. Chang-Yang And H. Tzung-Cheng (2012). "Exploring The Relationships Between Free-Time Management And Boredom In Leisure." Psychological Reports **110**(2): 416-426.

Wiseman, J. P. And S. Duck (1995). Having And Managing Enemies: A Very Challenging Relationship. Based On A Plenary Address Presented At The 2nd Conference Of International Network On Personal Relationships Held At U Iowa, Iowa City, May 11–15, 1989., Sage Publications, Inc.